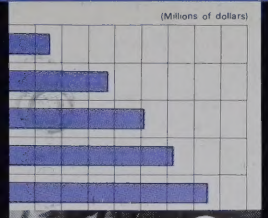
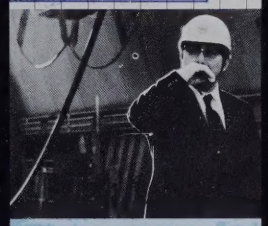
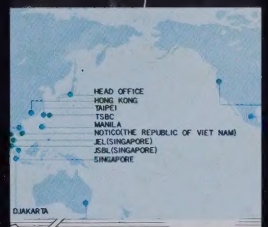
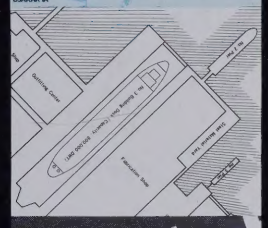
IHI Annual Report 1973

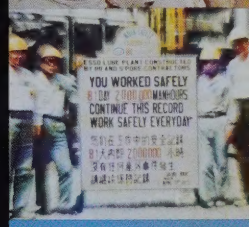








84,704	90,165
77,023	49,176
46,716	41,376
367,941	387,407
8,194	8,158
179,489	166,908
27,399	22,983
11,086	11,354



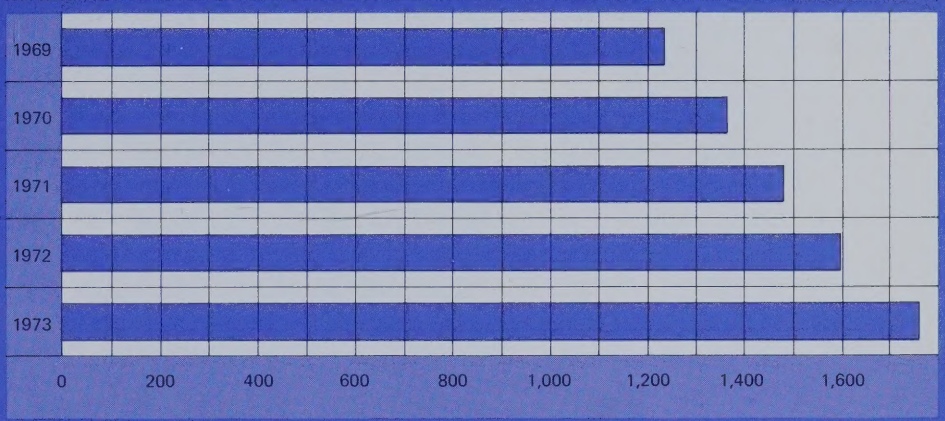
Ishikawajima-Harima Heavy Industries Co. Ltd.

Financial Highlights at a Glance

Year ended March 31, 1974

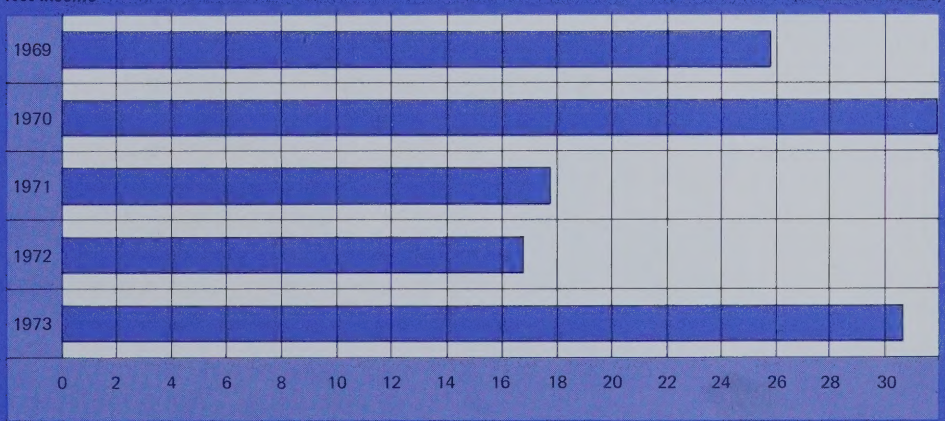
Net Sales	$1,760,964,000
Net income	30,674,000
Cash dividends (average 12% of par value)	16,327,000
Total assets	4,073,146,000
Orders received during the year	3,756,353,000
Order backlog at end of the year	5,678,988,000

Net sales (Millions of dollars)



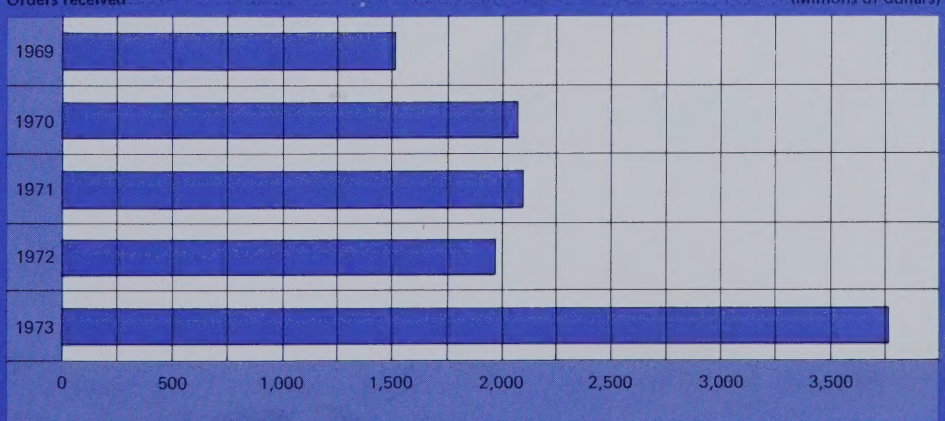
**Net sales for the year ended March 31, 1974 were $1,760,964,000, an increase of $164,575,000 or 10.3% over fiscal 1972.*

Net income (Millions of dollars)



**Net income for fiscal 1973 was $30,674,000, an increase of 82.9% over the previous fiscal year's record of $16,767,000.*

Orders received (Millions of dollars)



Comments on 1973 and Future Outlook

During the business year of 1973 ending March 31, 1974, our Ishikawajima-Harima Heavy Industries Company (IHI) achieved very satisfactory operating results. The amount of orders received, sales and after-tax earnings were ¥1,024,800 million, ¥480,400 million and ¥8,300 million respectively. These figures represented yearly growth-rates of 91%, 10% and 83%. On company after-tax earnings for the last half of the business year, the new excess profit tax was imposed.

Citing figures in this way, it may appear that the company's outlook for the rest of 1974 and beyond is encouraging. Since late last year, however, major industries have come to find themselves in a difficult situation in which prices of key materials follow an abnormally steep rise, while businessmen's willingness to invest in plants and equipment remains in the doldrums. The prime background factor has been worsening inflation.

The supply-cut in crude oil and the subsequent steep raise in its price by the oil-producing countries accelerated the rising pace of Japanese wholesale prices which began early in 1973 under impetus of a global increase in prices of foodstuffs.

One of the Japanese industries most seriously hit has been shipbuilding. The industry suffered big foreign exchange losses in claimable assets in dollars outstanding when the international currency setup encountered difficulties three years ago. These losses, however, came near being written off towards the end of 1973. It was in this situation when the industry was confronted with the oil shock, which was immediately followed by unprecedented inflation.

In the business year under review, the company's shipbuilding department delivered 43 new ships totaling 4,130,000 DWT including a 480,000-DWT tanker and received orders to build ships weighing 10,440,000 DWT in total.

In January 1974 our newly-established Chita Shipyard launched its maiden ship — the Andes Maru, a tanker of 254,300 DWT.

In accordance with our expansion program, we newly obtained 1,320,000 square meters of land for construction of a plant in Kagoshima Prefecture in southern Japan.

Private capital outlays and fiscal spending in public works projects, both of which are the major sources of orders for land machinery, were delayed or reduced because of policy measures to curtail inflation by holding down overall demand.

In the course of this development, our land machinery department made greater efforts to void contracts and received orders worth ¥326,800 million or up 51% over one year earlier from domestic customers. On the other hand, demand from abroad for machinery, centering on chemical machines and iron-manufacturing machines, registered a notable increase. Thus we could chalk up ¥158,700 million in land-machinery exports.

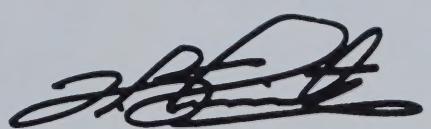
In January 1974 the Ishikawajima do Brasil Estaleiros S.A. (ISHIBRAS), one of our overseas joint ventures, celebrated the 15th anniversary of its founding. Completion of a 400,000-DWT dock and laying down of the keel of a 130,000-DWT tanker in the dock marked the second growth-stage of the shipyard. In this commemorative year, the shipyard started construction of a large-scale machinery manufacturing plant in the Benjamin do Monte, the suburbs of Rio de Janeiro.

In Singapore, our joint venture Jurong Shipyard Ltd. (JSL) continued to show gratifying results in the ship-repair business, and its subsidiary, Jurong Shipbuilders Private Ltd. (JSBL), delivered two Freedom-type standardized ships and additionally received orders for four Freedom vessels in the terms under review. JSBL also received orders for six tankers of 91,600 DWT each and has entered the second stage of operations.

Finally let us try to explain a little of our IHI's business philosophy and relate where the company is headed.

It is eternally true that a company cannot operate with certainty in all respects. However, it may safely be said that at no time has the future environment for business operations been clouded with such serious uncertainty as at present. In particular, the stabilized international value of the Japanese yen and wholesale prices, two major factors contributing to our growth for many years, have disappeared.

In the years to come the business environment will continue to undergo great changes which will considerably affect our business. However, unchangeable will be our responsibility to provide reliable products needed by society. All of us are determined to undertake every feasible step to fulfil this important responsibility.



Hisashi Shinto
President

Any idea how hard it is to build a steel mill in the jungle?

Building a steel mill anywhere is tough. Building one in the jungle is a lot tougher. But IHI is doing just that, in Brasil. And we know what we're doing. Because we've already built steel mills all over the world.

Our Brasil project is scheduled for completion sometime in 1975. When it's finished, we will have taken an extraordinary idea. And made it work.

Iron and Steel Plant Equipment

2,700-CUBIC-METER BLAST FURNACE FOR BRASIL

Brasil is often called the world's treasure house of natural resources. IHI is building in this country a new blast furnace with an inner volume of 2,700 cubic meters and a daily production capacity of 5,500 tons of pig iron. The furnace will be one of the two largest in Latin America.

The furnace, the third blast furnace at the Ipatinga Works of USIMINAS (Usinas Siderurgicas de Minas Gerais S.A.), is expected to be kindled on July 1, 1974, as intended.

Ipatinga, with a population of 80,000, has grown into a city of steel. From Rio de Janiero, it is an hour's plane flight and a five-hour's bus ride on a highway cutting through primeval forest country.

USIMINAS now operates at its Ipatinga Works two blast furnaces, both built by IHI. With the addition of the third big furnace, the powerful sound of IHI furnaces at work gathers further force in the steel city of Ipatinga.

IHI – INTEGRATED MANUFACTURER OF IRON AND STEEL PLANT EQUIPMENT

The company produces every type of equipment for iron and steel plants ranging from unloading facilities of materials to iron and steel making equipment, rolling mills, and final processing lines. IHI is Japan's only integrated manufacturer of iron and steel plant equipment.

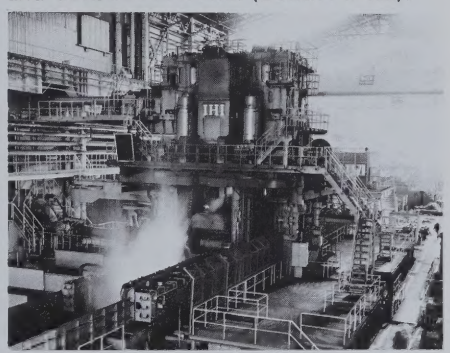
The most advanced and productive iron and steel plant equipment has been supplied by IHI to the steel industry not only in Japan but also in many other countries throughout the world.

BLAST FURNACES

Of the world's 20 largest blast furnaces in operation in November 1973, IHI has built 11. Japan's iron and steel industry is rated the most efficient in the world, and IHI has a more than 50% share in the domestic blast furnace market, an achievement testifying to the high levels of the company's technology in this field.

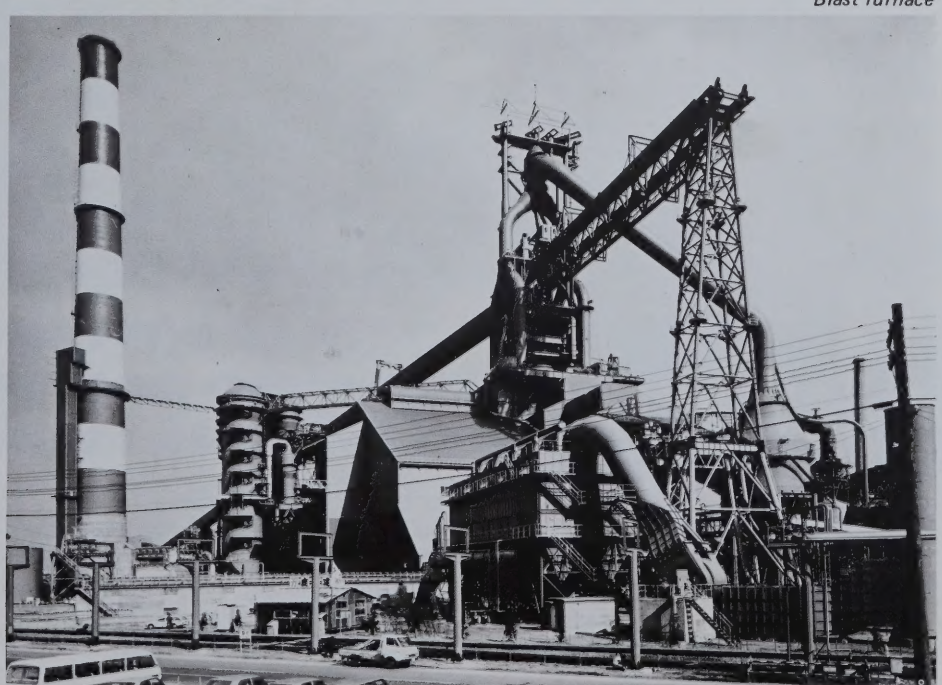
A noteworthy development of recent years, aimed at more efficient production of pig iron, is the large and growing number of high top-pressure blast furnaces. An innovation of epochal importance is the high-pressure top charging system developed by IHI which permits stabilized long-time operation of blast furnaces under high inside pressure.

The company has made the system available under license to such leading firms abroad as A.E. Anderson Construction Corp. (United States), Guetehoffnungshuette Sterkrade A.G. (GHH) (West Germany), Ashmore, Benson, Pease & Co., Ltd. (Britain), Vereinigte Oesterreichische Eisen-und Stahlwerke Alpine Montan A.G. (VÖEST) (Austria), and Vecor Projects and Construction Ltd. (South Africa).

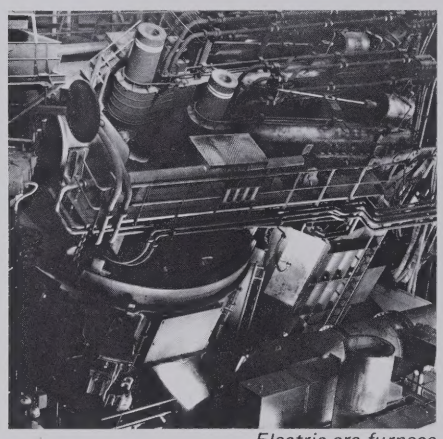


Slabbing mill

Blast furnace



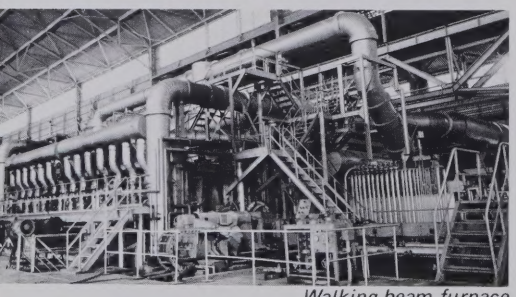
Among the blast furnaces IHI has built is the No. 1 furnace at Nippon Steel Corporation's Oita Works. This furnace has an inner volume of 4,158 cubic meters and a daily production capacity of 10,000 tons of pig iron, ranks among the world's largest high top-pressure blast furnaces. Abroad, IHI has built the two blast furnaces at USIMINAS's Ipatinga Works, Brasil, and a 2,654-cubic-meter high top-pressure blast furnace for Australian Iron and Steel Pty., Ltd.



Electric arc furnace

Coming into the business term under review, the company has added further to its record in the blast furnace field. It completed the No. 2 blast furnace at Sumitomo Metal Industries' Kashima Works, a 4,083-cubic-meter furnace with a daily capacity of 10,000 tons (maximum capacity 12,000 tons), also one of the world's biggest high top-pressure blast furnaces. For South Korea's Pohang Iron & Steel Co. it has built a 1,663-cubic-meter high top-pressure blast furnace with a daily capacity of 2,600 tons.

New orders for blast furnaces are streaming in to IHI, such as those from Nippon Steel Corporation for the No. 2 furnace at its Oita Works, from Sumitomo Metal Industries for the No. 5 furnace at its Wakayama Works, and from Pohang Iron and Steel Co. for its No. 2 furnace.



Walking beam furnace

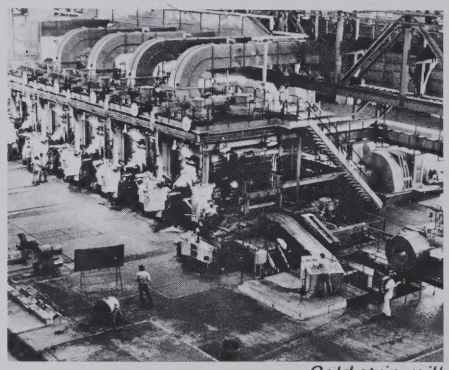
INDUSTRIAL FURNACES

IHI manufactures all types of industrial furnaces and other steel plant equipment such as mixer cars, mixers, LD convertors, soaking pits, electric arc furnaces, annealing furnaces, and heating furnaces.

In this equipment sector, the company has developed the technology of walking-beam-type heating furnaces and has made the related technology available under license to firms in France, West Germany, and the United States.

IHI Perma Block (IPB) refractory for lining UHF arc furnaces, developed by the company, has recently been attracting worldwide attention. IPB, installed at the hot spots of arc furnaces, greatly extends the refractory life of a UHF arc furnace.

A steady stream of orders for IPB arc furnaces is coming in to IHI from Japanese and overseas customers. Among IPB arc furnaces that the company has built are a furnace with a capacity of 60 tons for Sanyo Special Steel Co., two 75-tonners for the Steel Company of Canada, Ltd. (STELCO), and a 40-tonner for Philippine Blooming Mills Co., Inc.



Cold strip mill

ROLLING MILLS

The history of IHI in rolling mills is at times described as the history of rolling mill manufacture in Japan, so marked is the leading role of the company in this field.

IHI produces every type of rolling mill equipment — blooming mills, slabbing mills, plate mills, hot strip mills, cold strip mills, temper mills, billet mills, bar mills, rod mills, and others. IHI rolling mills are designed and built to meet the ever growing requirements of industry for mills of larger scale, greater speed and continuous operation, and higher standards of precision.

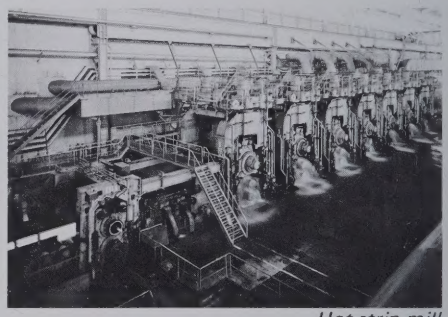
Among orders filled by the company is a seven-stand full-continuous hot strip mill delivered to Nippon Steel Corporation's Oita Works. With a roll width of 2,300 mm, it produces steel plates at a speed of 1,528 meters per minute, and has a monthly production capacity of 500,000 tons.

A 1,420-mm five-stand tandem cold strip mill has been delivered by IHI to Nippon Kokan's Fukuyama Works. A feature of the strip mill is its sensor-type hydraulic constant roll gap control system, developed by the company. The system results in strips of more precise uniformity in thickness and a finer finish. By using hydraulic pressure to maintain the vertical position of the rolls, it permits quicker response to changes in material characteristics and other operating conditions even when the rolling speed is raised.

IHI supplied this year a tandem cold strip rolling mill with the hydraulic control system to South African Iron & Steel Industrial Corp., Ltd. (ISCOR).

Among the larger rolling mill orders received by the company this year is that for the No. 2 plate rolling mill of Kawasaki Steel's Mizushima Works. Its 5,490-mm-wide rolls, the largest in the world, will be operated at a monthly production capacity of 150,000 tons in the initial stage and will be raised to 300,000 tons later.

In the nonferrous metals rolling mill field. IHI has established an outstanding record. During the term under review, IHI completed for Kobe Steel's Mooka Works a three-stand tandem hot finishing mill for aluminum, equipped with the sensor-type oil hydraulic constant roll gap control system.



Hot strip mill

CASTING EQUIPMENT

For casting the molten steel as it comes from the steelmaking furnace, IHI manufactures continuous casting equipment, under license from Vereinigte Oesterreichische Eisen-und Stahlwerke Alpine Montan A.G. (VOEST) of Austria. The company has supplied slab casters to Klockner & Co. of West Germany and other steel manufacturers.

OTHER STEEL PLANT EQUIPMENT

IHI also makes equipment for special steel plant equipment, high-precision final processing lines, yard facilities, transportation equipment, and ancillary products such as blowers, compressors, and dry gas holders.

A patient's life can depend upon electronic operating room equipment. What happens if there's no power generator?

This year, on a remote island off the west coast of Japan, a small generating plant was delivered. A generating plant powered by a diesel engine. A diesel engine made by IHI.

Small diesel generator engines aren't the only power plant components we make. And power plant components aren't the only products we make. But to this patient, on this operating table in a Sado Island hospital, an IHI diesel generating plant could be a matter of life and death.

Power Plants

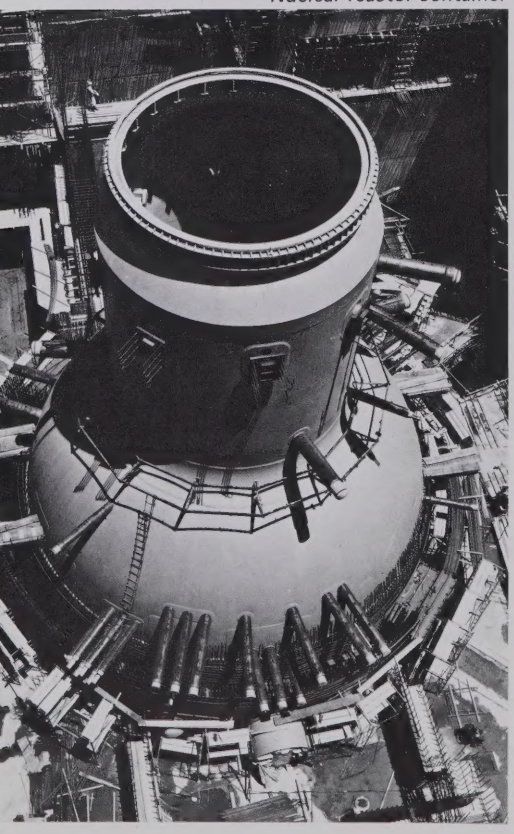
Sado is a small offshore island in the Sea of Japan. Electric power service was finally expanded to cover every part of the island this year. This was made possible by small diesel power generating plants, including a number made by IHI.

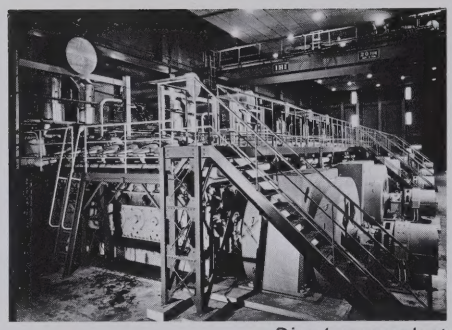
IHI builds equipment not only for giant nuclear energy or thermal power plants. It also manufactures small diesel generating plants and emergency power units utilizing aircraft engines, and supplies them to isolated islands, factories, and other localities which require them.

In addition to places like Sado Island, the company has built small electric power generating plants with IHI Pielstick diesel engines for Thailand's Lignite Authority and for the National Electricity Board of Malaysia. In the term under review, it has completed for Chichibu Cement Co.'s Kumagaya plant smokestack desulphurizing equipment which has a non-polluting diesel generating unit built into it.

IHI also builds gas turbine emergency power generating units using aircraft engines. In the term under review, the company delivered eight mobile gas turbine generators to Nippon Telegraph and Telephone Public Corp. The emergency power trucks can be dispatched in case of disasters or other emergencies to supply immediate power to the area affected.

Nuclear reactor container





Diesel power plant

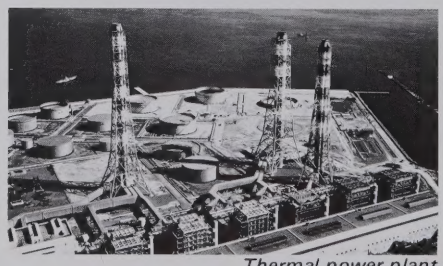
NUCLEAR POWER GENERATING PLANT EQUIPMENT

IHI builds equipment for nuclear power generating plants such as reactor pressure vessels, reactor primary containment vessels, and heat exchangers. The company's equipment is in operation at various nuclear power plants in Japan and other countries.

For example, IHI has supplied to Babcock & Wilcox Co. of the United States two 1,100,000kW reactor pressure vessels for installation at the Brown's Ferry Nuclear Power Station Units II and III of the Tennessee Valley Authority. For Babcock & Wilcox Co. of Britain, the company has built a 7,500,000 kW reactor pressure vessel.

In the term under review, IHI has been building a 540,000 kW reactor primary containment vessel and a reactor pressure vessel for Chubu Electric Power Co.'s Hamaoka Nuclear Power Station; and a reactor pressure vessel and a containment vessel for the Fukushima NPS's No. 3 generating unit of Tokyo Electric Power Co. and a pressure vessel and related equipment for the Fukushima NPS's No. 5 unit. The company has also received an order from Rotterdam Dockyard for a vessel ring.

An IHI plant, its Yokohama No. 3 Works, is devoted mainly to the manufacture of nuclear components.



Thermal power plant

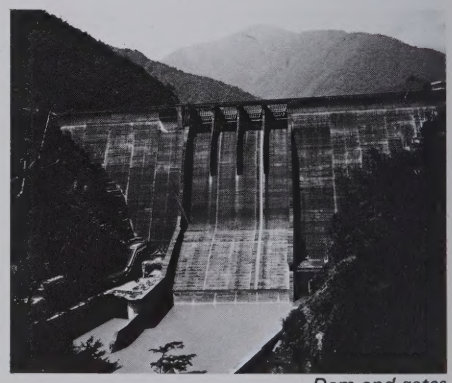
The plant has been authorized by the American Society of Mechanical Engineers (ASME), a universally authoritative organization in nuclear power engineering, to use the ASME's Code Symbol Stamps "N" and "NPT" on IHI nuclear components such as primary containment vessels, reactor pressure vessels, heat exchangers, and pipings in recognition of its high level of technology in the nuclear power plant field.

THERMAL POWER PLANT EQUIPMENT

Of the equipment in all of Japan's thermal power plants in terms of generating capacity, IHI has built more than 20 percent of the boilers. Among the numerous boilers that the company has supplied to power plants in Japan, the largest are the super critical pressure boilers each with an evaporation of 1,950 tons/h to generate 600,000kW/h installed at Tokyo Electric Power Co.'s Kashima and Anegasaki Power Stations.

These super critical pressure boilers raise thermal generating efficiency and reduce fuel consumption, and are used in an increasing number of thermal power plants. The company completed in the period under review a 1,750 tons/h boiler of this type for Kyushu Electric Power Co.'s Sendai Power Station.

Thermal power plant equipment built by IHI is operating in many plants abroad, too. The company is supplying two boilers for the No. 5 and No. 6 generating units, each with a generating capacity of 134,000kW, of the Shuwaiba South Power Station in Kuwait, presently under construction and scheduled for completion in October, 1974.



Dam and gates

HYDROELECTRIC POWER STATION EQUIPMENT

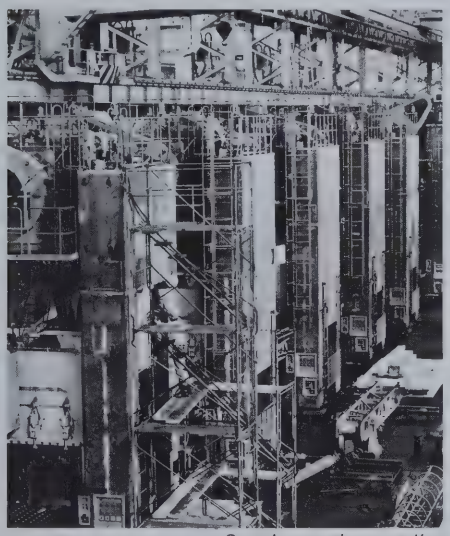
For hydroelectric power dams and stations, IHI builds dam gates, penstocks and other equipment for both domestic and overseas users.

Thirteen dam gates have been exported to British Columbia Hydro and Power Authority of Canada. Among other foreign users of IHI hydroelectric power station equipment is Furnas Electric Power Station of Brasil.

Industrial Machinery

INDUSTRIAL MACHINERY FOR AUTOMOBILE AND OTHER MANUFACTURING INDUSTRIES

IHI makes machinery for processing, forging and casting metals; machinery for molding plastics and rubber; and other various machinery for the automobile industry and other industries. These include mechanical, hydraulic and extrusion presses, plastic molding machinery, and casting machines. The company plays a major role in meeting the plant equipment requirements, the levels of which technological progress is rapidly raising, of the automobile and machinery industries.



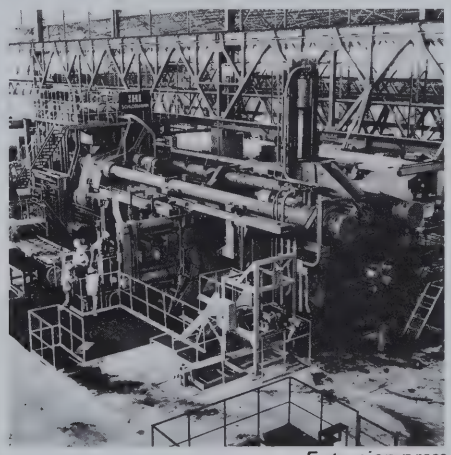
Synchromatic press line

EQUIPMENT FOR AUTOMOBILE INDUSTRY

The automobile industry is IHI's largest single customer for this type of plant equipment. A prime line of equipment that the company makes mainly for automobile manufacturers is mechanical presses with capacities from 500 tons to 2,000 tons. IHI has supplied more than 100 mechanical presses to the Japanese automobile industry, and their production performance has resulted in many repeat orders.

The company has developed a synchromatic press line combining several mechanical presses for completely automated sequential and continuous production of automobile components such as door panels, cabs, and bodies. The IHI synchromatic press line has been installed in plants of Toyota Motor Co. and other auto makers. In the term under review, the company delivered to AVTOPROMIMPORT, a Soviet state trading agency, synchromatic press lines to be installed in the Kama truck manufacturing plant in the Tatar Autonomous S.S.R., which is scheduled for completion in 1975 with an annual production capacity of 150,000 trucks.

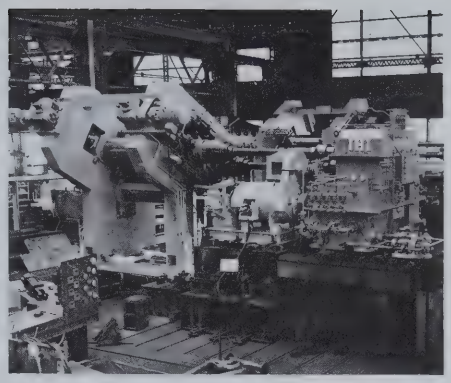
As other types of plant equipment for the automobile industry, IHI makes hydraulic presses, pipebenders, press benders, roller levellers, cold-roll molding machines which require no heating of sheet metal, and wide-coil continuous-extraction blanking lines, as well as die cast machines and forging machines.



Extrusion press

EXTRUSION PRESSES

IHI makes extrusion presses which, by simply changing attachments, can form hot aluminum into wheels, sashes, housings, containers and other products. The presses are made under license from Schloemann A.G. of West Germany. IHI has built for Light Metal Extrusion Development Co. of Japan an extrusion press with a capacity of 9,500 tons, the world's largest hydraulic press.



Calender machine

RUBBER AND PLASTIC MOLDING MACHINES

IHI makes a wide range of rubber and plastic molding machines. Its plastic injection and blow molding machines include types for manufacturing such products as plastic containers, automobile trunk covers, and instrument panels. For manufacturing rubber products such as belts and sheets, the company makes calenders, Rotocures, and other machines.

In the term under review, IHI completed tandem calenders for Toyo Rubber Co. and received an order from Sumitomo Rubber for a calender line.

Tractor

AGRICULTURAL MACHINERY

IHI affiliated companies such as Ishikawajima Shibaura Machine and Star Agricultural Machinery produce dairy plant equipment and farm machinery such as tractors, tillers, combines, rice planters, and feed cutters. They play important roles in the mechanization and modernization of agriculture in Japan and other countries throughout the world.

Last year we set a record. This year we hope it gets broken.

In 1973, IHI built a refinery in Singapore. We and our subcontractors worked for 81 days. We put in more than 2,000,000 manhours. And we did it all without a single accident.

We're proud of our world safety record. But this year, we hope it gets broken. By a new IHI construction project. Or by another company's project. After all, when hard work gets done without accidents, everyone comes out ahead.

Chemical Industry-I

IHI turned over in July 1973 an oil refinery and a lube oil plant to ESSO Singapore Private Ltd. and ESSO Singapore Lube Private Ltd. in Singapore. The plant site is on the island of Pulau Ayer Chawan in Singapore's Jurong district, one of Southeast Asia's leading industrial zones.

In constructing these complexes, we achieved a remarkable record of no time lost through accidents in operations extending to 2,220,000 man-hours for 100 days, a tribute to the safety of IHI engineering.

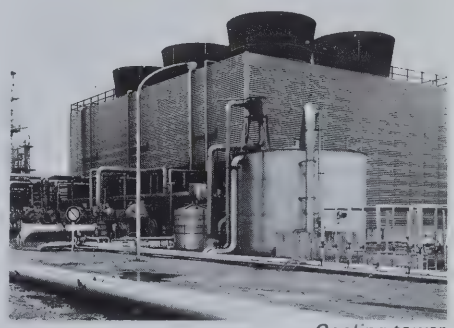
The project consisted of expanding the daily capacity of 80,000 barrels of the ESSO Singapore Refinery to 230,000 barrels and constructing an integrated lube plant with a daily capacity of 4,000 barrels. IHI formed a strong project team with the staff of Foster Wheeler Corp. for complete coordination in tackling the tasks ranging from engineering to the design, manufacture, procurement, and installation of equipment for the refinery and lube plant.

The lube plant is based on a new process developed by ESSO Research & Engineering and is the most modern facility of its type.

Oil refinery plant

FROM PLANT ENGINEERING TO CONSTRUCTION

If you want a plant built, see IHI. The company builds all types of plants — oil refineries, petrochemical plants, chemical fertilizer plants, and other types. IHI handles all phases of plant construction in an integrated system that covers everything from process planning, engineering, and plant layout to the design, manufacture and installation of equipment and construction.



Cooling tower

OIL REFINERIES, PETROCHEMICAL PLANTS

In the term under review, the company completed an oil refinery with a daily capacity of 150,000 barrels and a lube plant with a daily capacity of 4,000 barrels in Jurong, Singapore for ESSO Singapore Private and ESSO Singapore Lube Private.

There are numerous other orders that IHI has filled in the oil refining and petrochemical fields. For example, it built for Idemitsu Kosan Co.'s Chiba Refinery, Japan's largest lube plant with an annual capacity of 240,000 kiloliters. The plant uses the new hydro-treating process developed first by Gulf Research & Development Co. (United States).

Lube oil plant

Overseas, IHI has built for PERTAMINA, the Indonesian state oil corporation, a 100,000-barrel/day oil refinery.

In related fields, the company has constructed and equipped hydrogen plants, hydro-cracking desulphurizing plants, and sulphur recovery plants.

In the petrochemical plant field, IHI has to its credit the building of EDC, polyethylene, and methanol synthetic gas generating plants and other types. During the year under review, the company received an order from the People's Republic of China for a high-density polyethylene plant with an annual capacity of 180,000 tons. The contract calls for IHI to supply the complete equipment for the plant and to dispatch supervisory personnel for construction and installation.

The company is active in the chemical fertilizer plant field, where it has to its credit the construction of numerous urea, soda ash, and other types of plants.

HEAT EXCHANGERS

How good heat exchangers are has a great effect on the functioning of a plant. IHI makes water-cooled and air-cooled heat exchangers for any specific operating purpose and conditions, meeting fully these vital requirements.

FIRED HEATERS

IHI builds many types of fired heaters for oil refineries, petrochemical plants, and similar plants for the heating of raw materials, distilling, thermal cracking, property reformation and other processing. These fired heaters, made under license from Foster Wheeler Corp. (United States), include cylindrical, terrace-wall, box, and multi-zoned types. The terrace-wall and multi-zoned fired heaters are based on original concepts, are highly efficient, and are the most advanced types in this field.

LNG underground tank

OTHER TYPES OF PLANT EQUIPMENT

IHI makes all types of other plant machinery and equipment covering processing plant requirements such as towers, tanks, heat exchangers, cooling towers, and fired heaters.

TOWERS

The company has built towers of all types and sizes. These include large distillation towers built on the block system, turbulent contact absorbers for special kinds of gas, RDC extraction towers, reaction towers, and scrubbers. To handle orders created by the growing trend in industry toward larger-scale towers and higher pressure, IHI can fabricate towers of up to 1,000 tons in weight and with wall thicknesses to 300 mm., and is ready to deal with any requirements.

TANKS

Worldwide demand has grown for liquefied natural gas (LNG) as a form of pollution-free energy. The company manufactures almost all the LNG low-temperature storage tanks for the Japanese market, proof of IHI's advanced technology in this field.

In the development of structures and materials for cryogenic transportation and storage of liquefied gas, the IHI Research Institute has invented a prefabricated structural segment, COMPOSHELL, that combines the readiness of concrete slab and the toughness and weldability of steel shell. Used in the construction of underground tanks, COMPOSHELL makes possible safe and efficient storage of low temperature liquids such as LNG.

LPG tanks

IHI Is now making tanks for Tokyo Gas Co.'s LNG import terminal. The order for the import terminal calls for a total of five LNG low-temperature storage tanks: two 45,000-kiloliter on-ground-type tanks with inner wall material of aluminum alloy, one 60,000-kiloliter on-ground-type tank, and two 60,000-kiloliter underground-type tanks. The company has completed the three on-ground tanks and is now working on the two underground tanks.

Another order is from Abu Dhabi, one of the United Arab Emirates, for two LNG tanks to be used as the storage facility of an LNG plant under construction on Das Island. IHI expects many more orders for its LNG low-temperature storage tanks to follow from abroad.

The company manufactures as well, super low-temperature storage tanks for liquefied ethylene, hydrogen, oxygen and nitrogen.

IHI has also built more than 400 spherical tanks, including one with a capacity of 200,000 Nm^3, one of the largest in the world.

Another type of tank in which the company has an outstanding record is the floating-roof tank of which many have been built.

LNG on-ground tanks

OTHER CHEMICAL PLANT MACHINERY AND EQUIPMENT

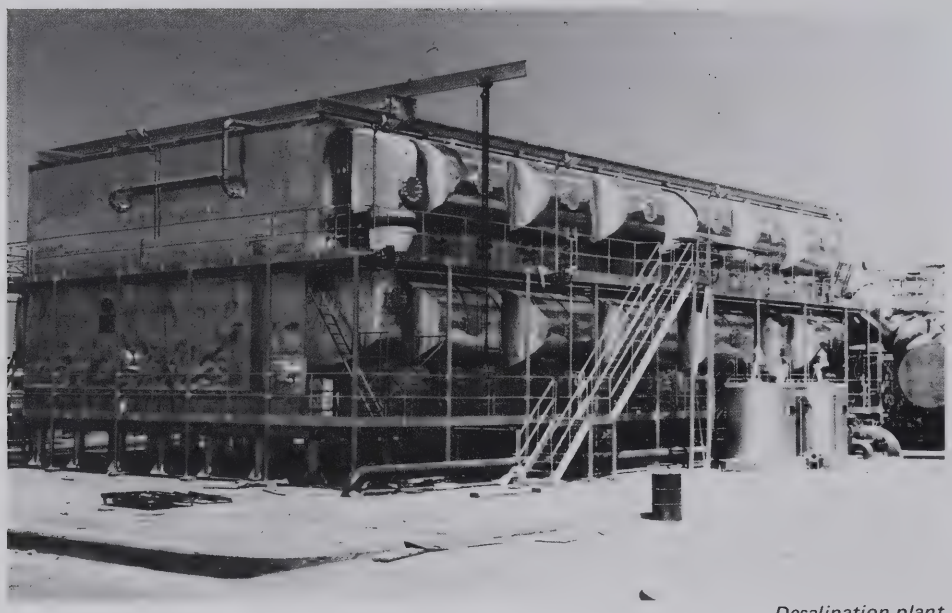
IHI machinery and equipment for chemical plants include Sweson type crystallizers, evaporators, spray driers, LNG low-temperature compressors, turbo compressors and other types of compressors, and refrigerating equipment.

The nearest water is about 100 miles away. Unfortunately, it's salt water.

Kuwait is a small country. It lies at one end of the Great Arabian Desert. And the only water for miles is salt water.

That's where IHI comes in. We've built water desalination plants for Kuwait. Seven of them so far. Producing a total of 21 million gallons of fresh water per day. About 30% of Kuwait's total water needs.

We might not have turned the desert green yet. But we're working on it.



Desalination plant

IHI has received from the Kuwait Ministry of Electricity and Water orders for two seawater desalination plants, each with a daily capacity of 5,000,000 imperial gallons, the largest order to this kind ever received by IHI.

The company has already completed for Kuwait four desalination plants each with a daily capacity of 2,000,000 imperial gallons and one plant with a capacity of 4,000,000 imperial gallons.

In addition to the Kuwait orders, IHI has supplied a 480,000-igpd seawater desalination plant to Arabian Oil Co. at its Khafje fields, and a 580,000-igpd plant to Matushima Kosan Co's Ikejima coal mine.

The company has been engaged since an early date on research and development in converting seawater to fresh water and has successfully developed a practical flash desalination process. With many nations facing severe shortages of water, IHI looks forward to further strides in this field.

Chemical Industry–II

CEMENT PLANTS

The SF sintering process (Suspension preheater with Flash furnace) developed by IHI, in cooperation with Chichibu Cement Co., is gaining keen and widespread interest in the cement industry in Japan and abroad.

In an SF cement sintering plant, a flash furnace is placed between the rotary kiln and the suspension preheater. Compared with the older SP (suspension preheater) process, the SF process raises the kiln production capacity by 2 – 2.5 times and reduces the nitrogen oxide content in the kiln exhaust gas to one-fourth or one-fifth of that in the SP process.

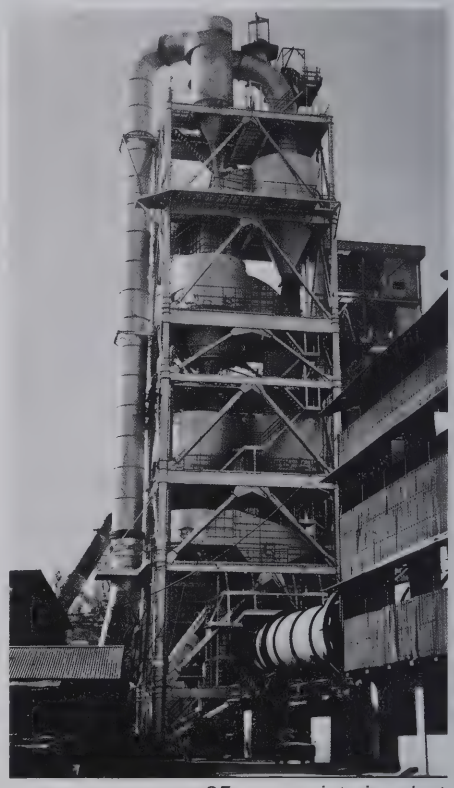
Installation of the SF process will make possible construction of kilns with a daily capacity of 8,000 to 10,000 tons, hitherto considered beyond reach. SP cement sintering plants can also be converted to SF.

In the year under review, the No. 6 kiln at Chichibu Cement's Kumagaya plant was converted to the SF process and its daily capacity raised from 2,000 tons to 7,500 tons. IHI has carried out similar conversions from SP to SF process for Nittetsu Cement, Nihon Cement, Chiyoda Cement, and other cement producers.

Orders are coming into the company in a steady stream for SF cement sintering plants from Japan and many other countries. General Cement Co., Greece's largest cement producer, has ordered a 4,000-ton-day IHI SF plant, and Fars & Khuzestan Cement Co. of Iran two IHI SF plants, one with a daily capacity of 2,700 tons and the other with a capacity of 2,500 tons.

Manufacturers of cement plant equipment are also interested in the IHI SF process. IHI has licensed the Fuller Co. (United States), a subsidiary of General American Transportation Corp. (GATX), to manufacture the SF process and related equipment. The Japanese cement plant equipment industry has been heavily dependent on Western technology, and the turnabout achieved by IHI represents a vast stride ahead for the industry.

It should be noted that an order for a conventional cement plant with a daily capacity of 600 tons was received from the Abu Dhabi Government of the United Arab Emirates where demand for cement has been on an increase.



SF cement sintering plant

ENVIRONMENTAL SANITATION MACHINERY AND EQUIPMENT

Solution of pollution and other environmental problems is now of worldwide concern.

In the field of pollution control and environmental conservation and sanitation, IHI produces many types of machinery and equipment, such as mechanical and electric dust collectors, turbulent contact absorbers, desulphurization systems, waste-water processing equipment, centrifugal separators, tall smokestacks, flare stacks, and devices related to noise suppression such as a ground test cell for jet aircraft engines.

A major contribution by the company in pollution control was its delivery of a set of large wet-type flue gas desulphurization equipment for industrial boilers to Mitsui Semboku Petrochemicals Inc. The equipment can process 480,000 Nm^3 of flue gas per hour. It is based on the IHI-TCA (turbulent contact absorber) process for desulphurizing flue gas.

Desulphurization plant

IHI also provides standard exhaust gas desulphurization devices for small boilers and IHI-CEMICO desulphurization devices for large boilers.

The company makes thermal cracking equipment for treating fuel oil with a high sulphur content and is building for Toa Oil Co.'s Kawasaki Refinery a powerful gassification desulphurizing plant that will reduce the sulphur content of fuels to less than 0.1 percent.

The caustic soda industry is now switching from the mercury process, which results in heavy-metal contamination of coastal waters and rivers, to the membrane process. The switchover is urgent, and IHI has been engaged for some time past in developing concentration equipment required for the membrane process. The company is receiving numerous orders for this equipement, now successfully developed for application, from such firms as Asahi Glass and Sumitomo Chemical.

Another type of environmental sanitation equipment is being supplied by IHI for the Japan Highway Public Corp. Along the route of the Chuo Motorway is the 8,476-meter Enasan Tunnel, the longest road tunnel in Japan. For the tunnel's ventilation system to assure the safety of drivers, the company is building eight sets of 2,800 mm. dia. blowers and exhaust fans, which will be driven by electric motors with a total capacity of 6,000 kW.

Gas analyzing truck

Noise suppressor

Also, the company is actively tackling the development of systems for the suppression of noise caused by industry.

Among the IHI equipment and systems for suppressing noise are devices for lowering the sonic levels of boiler fans, diesel engines, and industrial furnaces, noise-suppression designs for spherical tanks and chemical plants, ground test cells for jet aircraft engines, and devices for lowering the sonic level of jet aircraft under test runup on the ground. The company makes these and many other similar items.

A major advance in this field during the period under review was the delivery by IHI to Japan Air Lines of equipment for suppressing the noise of jumbo jet aircraft engines undergoing repair and maintenance tests. The equipment was made under license from Oskar Gerber GmbH (Switzerland) which already installed equipment of similar kind at Zurich airport, where permissible sonic levels are said to be the most severe in the world.

The equipment is to be used by Japan Air Lines at the New Tokyo International Airport, now under construction.

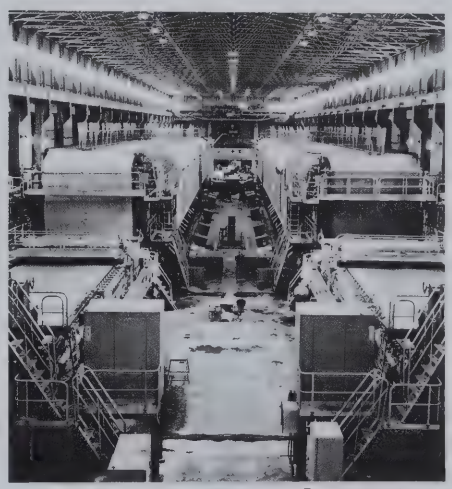
IHI has delivered noise suppression equipment for F-4EJ Phantom jet fighters to the Japan Defense Agency and has received new orders for additional sets of the equipment.

PULP AND PAPER MILL MACHINERY

The company manufactures a complete line of pulp and paper mill equipment from pulp mills to stock preparation machinery, paper machines, coating machines, laminating machines and drying equipment. The equipment covers all processes from the handling of logwood to turning out finished paper products.

IHI's paper machines are ultra-high-speed types that can produce newsprint or kraft paper at the continuous rate of more than 1,000 meters per minute. The company's vertiformer paper machines, which make paper with identical characteristics on both sides, and vacuum-former paper machines, made under license from Oy Tampella Ab. (Finland), are highly rated in the paper industry.

During the period under review, among deliveries were those to Honshu Paper Co. for a 3,650-mm. veriformer paper machine for its Fuji mill and a 3,050-mm. conventional paper machine for its Iwabuchi mill and to Nippon Pulp Co. for a 3,850-mm. conventional paper machine for its Yonago mill.



Paper machines

IHI gets numerous orders from abroad as well for pulp and paper mill machinery and equipment. Recent deliveries to Indonesia, for example, were for the Ministry of Industry for a complete cigarette paper plant with a daily capacity of five tons and for Delta Paper Co. for a 2,000-mm. fourdrinier paper machine.

Golden Horn Bridge

Civil Engineering

500 years ago, a man dreamed of building a bridge between Europe and Asia.

The man was Leonardo da Vinci. He had visionary ideas. One of them was a bridge between Istanbul and Asia Minor. This year, in modern-day Turkey, IHI is building it: the Golden Horn Bridge. It's not the biggest bridge IHI has built. But it might be the most historic.

On paper, Leonardo's idea seemed impossible. Now, five hundred years later, we're making it work.

IHI is proud of the role it has played in the construction of the Golden Horn Bridge, the historic span to link Europe and Asia. It is proud that it, an integrated heavy industry manufacturer in Japan, far removed from Istanbul, was chosen for this epoch-making project.

The company has consistently striven to develop new methods of construction engineering to meet the varying requirements at the sites where it undertakes work, has achieved a high level of technology in bridge-building, and has many outstanding bridges to its credit.

In New Zealand, for example, IHI tackled the job of widening the Auckland Harbour Bridge, 1,100 meters in overall length and 14 meters wide. This involved building a box-girder bridge on either side of the bridge and widening the bridge deck from four lanes to eight lanes. Using floating cranes, IHI succeeded in greatly shortening the construction time.

Again, building the Oi No. 5 Bridge in Tokyo, the company used for the first time its newly developed "Lift-up Barge" method. Huge prefabricated bridge blocks were lifted into place by the barge's hydraulic jacks, cutting construction time sharply.

IHI's advances in bridge construction technology are attracting worldwide attention.

BRIDGES

IHI, in addition to the Golden Horn Bridge, has undertaken numerous other major bridge projects in the period under review.

In South Korea, it has completed the Namhae Bridge, 660 meters long with a center span of 404 meters, the longest suspension bridge in the country. The company was in charge of supervision of the whole work and constructed the two main towers and girders. The bridge incorporates main towers of mono-block construction and all-welded box-type stiffening girders developed and made by the company.

The company undertook in Japan construction work on the Kanmon Bridge and the Minato Ohashi Bridge.

The Kanmon Bridge, 1,068 meters in overall length and with a center span of 712 meters, connects the main Japanese island of Honshu and Kyushu. It is the longest suspension bridge in the Orient. IHI was in charge of construction of the main tower on the Kyushu side, a structure 133.8 meters in height and weighing about 3,000 tons. The bridge was opened to traffic in November 1973.

The Minato Ohashi Bridge is now under construction in Osaka, Japan's second great metropolis. The bridge will have an overall length of 980 meters and a center span of 510 meters, making it the world's third longest cantilever truss bridge. IHI, on February 26, 1974, installed in only four hours the 186-meter-long 4,500-ton center girder of the bridge in an epoch-making feat in bridge construction engineering. The center girder prefabricated and transported by sea, was slowly lifted by winches and pulleys from the water surface to a height of 51.5 meters, then connected to the left and right fixed girders.

Minato Ohashi Bridge

CIVIL ENGINEERING MACHINERY

The company makes numerous types of civil engineering construction machinery and concrete pumps.

For foundation work, IHI's product line includes jet hammers, diesel and steam pile hammers, and other pile-driving equipment and various types of boring machines. Its equipment is widely used for foundation work on buildings, bridges, wharves, embankments and other projects.

Highly rated is IHI's Jet Hammer. Recently developed by the company, it uses an atomized fuel system that greatly increases the driving power of the hammer head.

IHI's machines for construction work include shield tunneling machines, tunnel boring machines, bucket-wheel excavators, and small compressors. The IHI shield tunneling machines are much used in subway and sewage and drainage works construction. The company's tunnel boring machines are now at work digging the test tunnel for the Seikan Tunnel to connect the Japanese islands of Honshu and Hokkaido and which will be the world's longest undersea tunnel.

Jet Hammer

Mobile piler

Contributing greatly to shortening work time and raising efficiency in the concrete pouring for the construction of buildings and other structures are the mobile concrete pumps made by IHI. Rating well ahead of competitive models, one large IHI mobile concrete pump discharges concrete at the rate of 85 cubic meters per hour.

In another but related field, the company is the builder of various types of work vessels. Among them are the 6,251-gross-ton Tokushun Maru No. 1, with a hopper capacity of 4,000 cubic meters and a maximum dredging depth of 27 meters, one of the world's largest dredgers, and the Taisei Maru No. 10, Japan's largest piling barge.

Indispensable in the construction of high-rise buildings is the climbing crane built by IHI. The cranes have been used in the construction of the highest buildings in Japan such as the 47-story , 170-meter tall Keio Plaza Hotel, the World Trade Center Building, and the Kasumigaseki Building.

FULLY AUTOMATED DISHWASHERS

The company makes fully automated dishwashers for hotels, hospitals, restaurants and similar establishments. The machines wash, sterilize, and dry automatically at rates of 1,300 to 13,500 dishes per hour.

STANDARD BOILERS

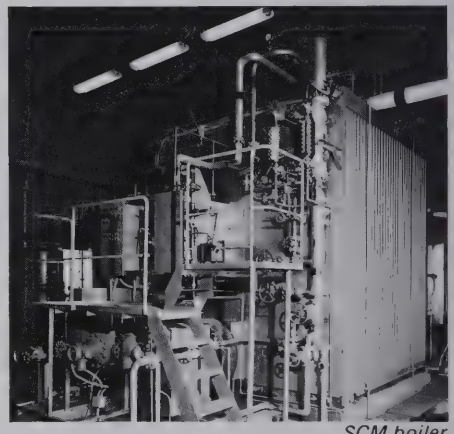
In addition to making extra-large boilers for specific industrial applications, IHI manufactures smoke-tube, water tube, and small once-through boilers for factories and buildings.

The smoke-tube KM boiler is highly efficient and has a low fuel consumption rate. IHI has made and sold about 10,000 of these boilers, evidence of the high rating they have received from industry and trade.

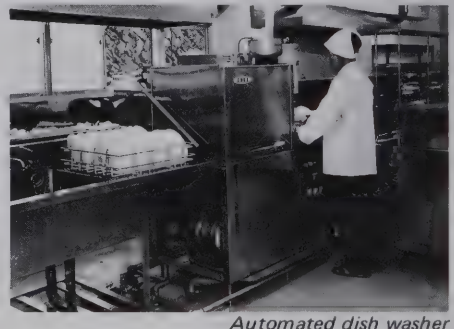
The water-tube SCM boiler made by the company is extremely economical, and this IHI boiler ranks highly in its class in Japan.

For building airconditioning, unit heating, and central heating systems, the company produces a broad range of heater and hot-water boilers. Its KM boiler is also widely used for building heating systems.

IHI has a solid record in many turbo refrigerators and central heating and airconditioning systems it has supplied to buildings, hospitals, and other large facilities.



SCM boiler



Automated dish washer

Some countries have plenty food. Why don't they just ship it to countries that don't have enough?

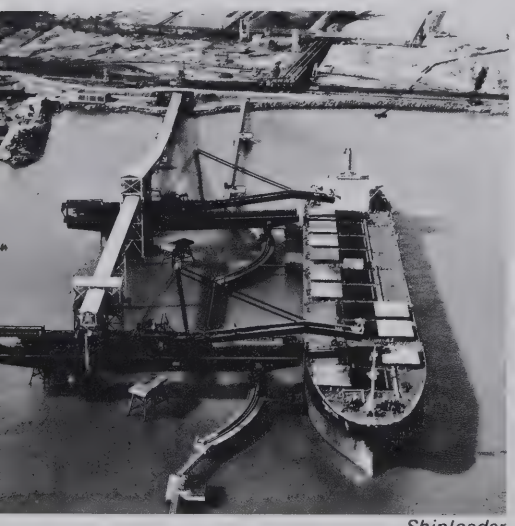
Because that's not as easy as it sounds.
To export food, a country needs special port facilities.
Special refrigerators. Special warehouses. Special silos.
Special cargo handling equipment.
IHI is building these port facilities for Brasil,
as part of the historic Export Corridor Plan.
Brasil has thousands of tons of food available for export.
We're making sure it gets where it ought to go.

Cargo Handling Machinery

IHI'S ROLE IN BRASIL'S EXPORT CORRIDOR PROGRAM

With orders secured from the Brasilian Government's National Department of Port and Navigation Waterways, IHI is working on the modernization and expansion of the harbor facilities in the ports of Santos, Paranagua and Rio Grande. The work involves building conveyor lines and equipment for unloading, collecting, and loading grain at three ports and also building a meat refrigerating warehouse, two 30-ton container cranes and other meat handling equipment at Rio Grande.

The task undertaken by IHI is part of the Brasilian Government's Export Corridor Program. In order to build up an efficient export system for the grain, ore, and other resources products that the rapidly developing Brasilian economy can turn out, the Brasilian Government is vigorously advancing this program of expanding and building harbor facilities, intermediate collection and transshipment points, storage facilities, and railway systems to link producing areas and export ports.



Shiploader

IHI has assumed entire responsibility for all phases of the work from consulting and planning work on the positioning and layout of the facilities for optimum efficiency, engineering work on the facilities, manufacture of the equipment, foundation work and construction, and installation. The company is putting its resources in technology and facilities construction into this important task in full measure.

Gantry crane

CARGO HANDLING MACHINERY

IHI has a proud record of achievements in cargo handling machinery, which is used in Japan as well as in all parts of the world – in ports and harbors, shipyards, iron and steel mills, power plants, construction sites, etc. IHI has also directed positive efforts to the development of automated systems for physical distribution such as fully automated warehouses, container yards, air cargo terminals, etc.

CARGO HANDLING MACHINERY FOR PORTS AND HARBORS

IHI cargo handling machinery for ports and harbors are in use throughout the world. Two of the largest shiploaders in the world, each of 16,000 t/h capacity, were recently completed by IHI for the Compania Vale do Riodoce of Brasil. They are part of plans to double the ore loading capacity of the Port of Tubarão, the world's largest port shipping out iron ore. Besides shiploaders, IHI has manufactured a 16,000 t/h stacker and three 8,000 t/h reclaimers.

IHI unloaders are also hard at work. In Australia, a 1,200 t/h bauxite unloader has been installed for the Queensland Aluminum Pty. and in Japan, two 2,500 t/h unloaders have been completed for the Nippon Steel Corporation. Recently, pneumatic unloaders have come into use to increase efficiency in unloading grain and cereals. For example, IHI completed during the term under review a 600 t/h pneumatic unloader for Showa Sangyo Co., Ltd. Many inquiries are expected concerning pneumatic unloaders particularly since Japan is dependent almost entirely on imports for its supply of such grain and cereals as wheat and soyabeans.

Also, IHI's container cranes are being extensively used in cargo transportation.

Container crane

During the term under review, IHI completed two 40-ton container cranes for the Port of Tacoma, Washington, U.S.A., and one 45-ton container crane for Keihin Gaibo Futo Kodan in Japan. IHI recently placed on sale a new quayside container crane called the "Universe" which can not only be used as an efficient container crane but also with such accessories as grab buckets or hooks, used in various ways to handle coal, iron ore, grain and cereals, automobiles, steel plates and materials, scrap, etc. It is especially handy for use in ports where there is comparatively little use for containers.

CRANES FOR STEEL MAKING

IHI cranes are in use in iron and steel plants throughout the world. These cranes are of various types for various uses such as unloaders, stackers, reclaimers, conveyors, ladle cranes, stripper cranes, etc. Of the ladle cranes used to carry molten metal to the billet plant, IHI recently delivered a 320/60-ton ladle crane to Sumitomo Metal Industries, Ltd. and a 130/30-ton ladle crane to Sanyo Special Steel Co., Ltd. IHI also delivered a 90-ton stripper crane for lifting out billets from the ingot case to the Kimitsu Plant of Nippon Steel Corporation.

SHIPBUILDING CRANES

IHI has built so many cranes for shipbuilding that it is said that half the cranes in use in Japanese shipyards are made by IHI. During the term under review, IHI completed a 250-ton gantry crane for the Hakodate Dock Co., Ltd. This and the two 300-ton gantry cranes that IHI installed at the Oppama Yard of the Sumitomo Shipbuilding & Machinery Co., Ltd. in Tokyo Bay in 1972 are examples of IHI's typical gantry cranes.

During the term under review, IHI completed two 200-ton swing-lever type level luffing cranes (LLC) for Cantiere Navale Breda S.p.A. of Italy, and another 200-ton LLC for ISHIBRAS (Ishikawajima do Brasil Estaleiros S.A.) of Brasil.

STANDARD MODEL CRANE

IHI also manufactures standard model cranes that can be mass-produced: the PM type overhead traveling crane using strong, lightweight pipes for the girder, and the CH type overhead traveling crane. These cranes are produced at a rate of 40 to 50 units per day. Other IHI cranes are the SBM type overhead traveling crane with the girder of steel plate shell construction, the M type overhead traveling crane with the girder of truss construction, the standard gantry crane, etc. IHI also makes standard type climbing cranes and jib cranes for building construction work.

JCC crane

FLOATING CRANE

IHI completed during the term under review the world's largest floating crane with a lifting capacity of 3,000 tons. It was delivered to the Fukada Salvage Co., Ltd. for laying caissons and other such foundation work, building bridges and port and harbor facilities, and for transporting heavy materials.

Floating crane

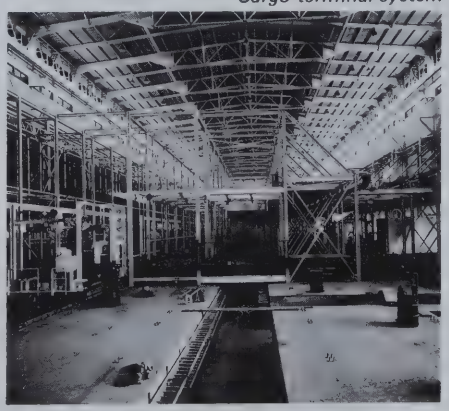
AUTOMATED WAREHOUSE

Progress is being made daily in the automation of physical distribution systems. The Auto-Stack Building developed by IHI is playing a key role in distribution. During the term under review, IHI completed the world's biggest Auto-Stack Building for the Nissan Motor Co., Ltd. This building is capable of housing 22,080 pallets, each 1.7 meters by 1.1 meters, containing automobile parts. Computers are used to record the flow in or out of parts and to control the operation of the cranes for complete automated supervision of parts in the warehouse.

IHI had earlier delivered an Auto-Stack Building with a capacity of 20,384 pallets to the Toyota Motor Co., Ltd., but the Auto-Stack Building for Nissan Motor is larger and incorporates the newest facilities for picking and crating.

Also in a technical tie-up with the SI Handling System Co. of the U.S., IHI manufactures and sells the Ordermatic System. This system features a single, automatic process for picking and selection. IHI has completed in the outskirts of Tokyo an Ordermatic System capable of handling 25,000 cartons a day (for some 130 branch stores) at the Fuchu Distribution Center of the Seiyu Stores Co., Ltd.

Cargo terminal system



IHI has also built a cargo terminal system for Japan Air Lines in the new Tokyo International Airport presently under construction at Narita City near Tokyo. Composed of an information system and a cargo handling system, this cargo terminal system provides virtually complete automatic handling of air cargos. The information system does all operations from reservations to the listing of cargo and processing of arriving and departing cargo.

The cargo handling system does everything from the selection of cargo to the loading and unloading of containers and pallets, all automatically. This IHI automatic cargo handling system is attracting wide interest as it will be even more advanced than similar systems presently in operation at Kennedy International Airport, U.S. and Schiphol International Airport, Holland.

CAR PARKING FACILITIES

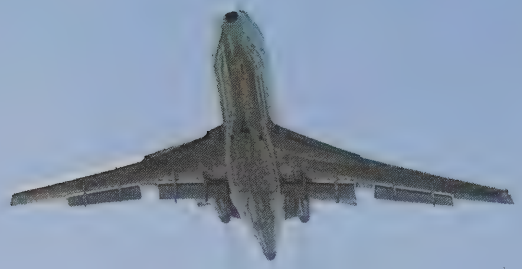
To help deal with the car-parking problem in cities, IHI builds parking machinery and facilities.

The company has built more than 500 Tower Parking facilities. These are multi-storied structures with gondolas suspended from ferris-wheel lifts that raise and lower the cars to be parked. Each unit has a capacity of 20 to 50 cars.

To handle larger parking requirements in limited ground space of more than 100 cars, IHI makes, under license from PARCAR Ltd. of Britain, Parcar Garages, which enjoy a highly favorable standing in the parking equipment market.

INDUSTRIAL ROBOT

IHI is presently engaged in research and development of various automatic labor-saving machinery. An industrial robot developed by IHI, for example, is efficiently serving industry in a number of fields.



Aircraft Jet Engines

Lockheed L-1011 TriStar

Before anyone climbed aboard this plane, we made sure it could get off the ground.

Once this plane takes off, its safety is the pilot's responsibility. But making sure its engines can get it up in the air, and keep it up in the air, is our responsibility.

IHI conducts performance tests, periodic safety checks, and routine overhauls on many of the biggest aircraft engines in use by Japan's major airlines. With aircraft engines, you can't take any chances. You have to know they're going to work.

IHI makes sure they do.

The Lockheed L-1011 TriStar is now flying the skies of Japan. IHI is in charge of overhauling the three RB-211 turbofan jet engines of this big 195-ton airliner.

IHI was one of the first companies in the world to take up the manufacture of jet engines. IHI with its long experience and high technical skills is now fully engaged in maintaining safety in the air.

For example, the JT8D turbofan jet engines of the Boeing 727s and 737s of the Japan Air Lines, Toa Domestic Airlines and All Nippon Airways are overhauled by IHI, which means that IHI is in charge of overhauling the 727s and 737s owned by all three major Japanese airline companies.

During the term under review, the U.S. Federal Aviation Administration designated two IHI plants at Tanashi and Mizuho as authorized repair plants for the JT3D engines of Boeing 707s and DC-8s. The FAA had earlier authorized these two plants to repair the JT8D turbofan jet engines of Boeing 727s and 737s. IHI thus became one of the leaders in the manufacture and repair of jet engines.

JET ENGINE MAKER WITH A LONG HISTORY

In 1945, IHI made Japan's first jet engine, the Ne-20. It was one of the first jet engines in the world after those of Britain and Germany. Jet engine production was then discontinued, but in 1952 research and development of jet engines was resumed. In 1959, IHI succeeded in developing the J3 turbojet engine, a purely Japanese product. IHI presently manufactures all kinds of jet engines — not only turbojet engines but also turboprop engines, turboshaft engines, turbofan engines as well as a lift engine that is now in an experimental stage of development. These jet engines are turned out by two modern plants. IHI thus ranks among the few makers of jet engines in the world.

TURBOJET ENGINE

IHI manufactures the J3 turbojet engine and the J79 turbojet engine.

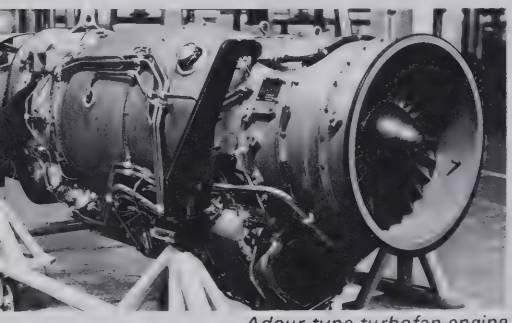
The J3 turbojet engine, which was developed by IHI with its own technology, powers the T-1B intermediate jet trainer and the P-2J anti-submarine patrol craft. During the term under review, IHI produced 23 of the engines.

The J79 turbojet engine is of two types — the J-79-11A for the F-140 jet fighter and the J-79-17H for the F-4EJ Phantom jet fighter. During the term under review, IHI delivered 61 J-79-17H jet engines for the F-4EJ Phantom jet fighter to Japan's Defense Agency and received orders for 48 of the engines.

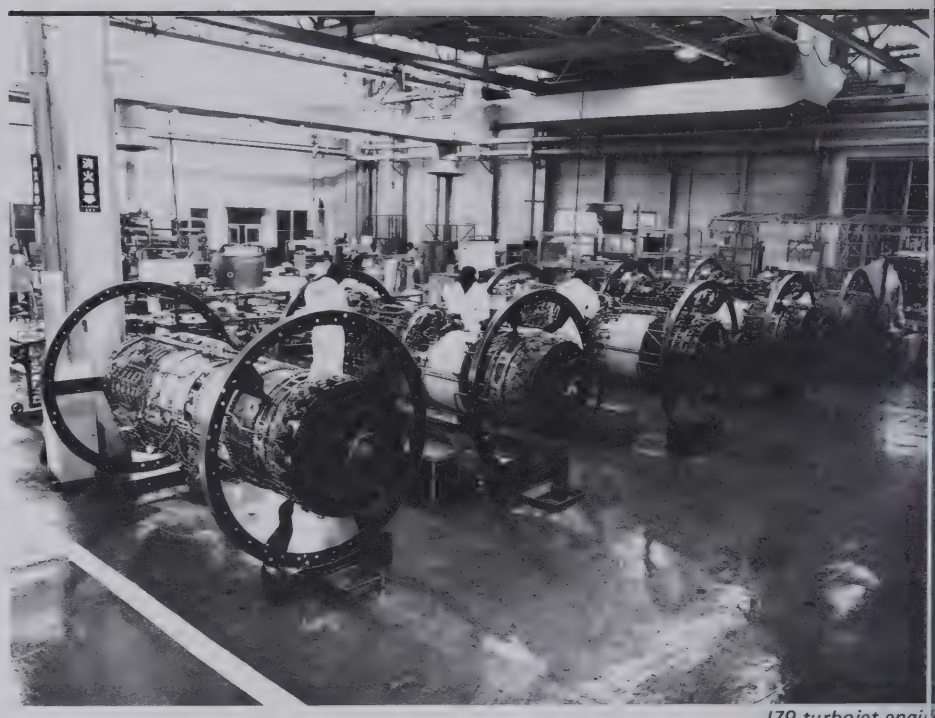
TURBOFAN ENGINE

IHI produces the Adour-type turbofan engine developed by Rolls-Royce/ Turbomeca Ltd. and has delivered many of the engines to Japan's Defense Agency to power the T-2 supersonic training plane.

Since 1971, IHI in cooperation with the Japanese Government, has been developing a large-type turbofan jet engine. The first such engine was completed during the term under review. IHI is continuing research and experiments to develop a jet engine with a low noise level and clean exhaust.



Adour-type turbofan engine



J79 turbojet engi

TURBOSHAFT ENGINE

IHI is presently producing the T58 (CT58) turboshaft engine. A powerful, yet lightweight and small size engine, it is considered ideal for helicopters.
It powers the Vertol V-107, and Sikorsky S-61, Sikorsky S-62 and HSS-2 helicopters.
IHI has delivered many of the engines to the Defense Agency, the Maritime Safety Agency and private companies.

KV-107 helicopter

TURBOPROP ENGINE

The T-64 turboprop engine is used to power the PS-1 flying boat and the P-2J anti-submarine patrol craft. The engine is used in many fields because of its exceptional fuel economy. Moreover, it can be converted into either a turboprop or turboshaft engine simply by changing the gears to decrease the revolutions of the shaft.

LIFT ENGINE

The vertical takeoff and landing craft (VTOL), which does not require a long runway, is particularly suited to Japan with its narrow land area. As a result of studies and experiments in the development of a lift engine for the VTOL in cooperation with the Japanese Government, IHI completed the JR-100 lift engine and succeeded in a manned flight test of the engine on a flying test bed.
IHI has produced experimental models of more efficient engines — the JR-200 and JR-220 — and is continuing tests in this direction from many angles.

OTHER APPLICATIONS

Jet engines are used not only for aircraft. They are used as the motive power for electric generators, trains and compressors as well as for hydrofoil craft, hovercraft and speedboats.

A conspicuous example in such application of the engine is a 1,000 KVA mobile gas turbine generator delivered to Nippon Telegraph and Telephone Public Corporation. This emergency power truck has a generator powered by the IM-100 engine, the same engine used for hovercraft and trains (derived from the CT-58 turboshaft engine for helicopters) and can go to disaster areas for quick supply of power. Although of 1,000 KVA capacity, it is the same size as a 250 KVA diesel engine generator. The Nippon Telegraph and Telephone Public Corporation has placed orders with IHI for 15 of the trucks.

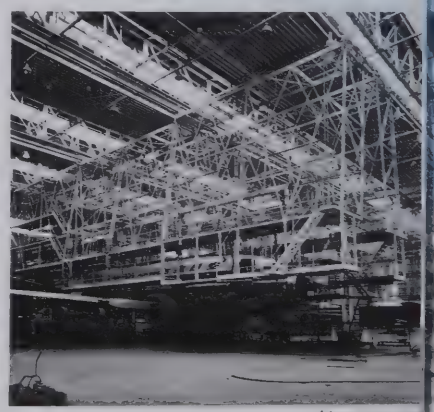
Mobile power generating truck

IHI HANGAR SYSTEM

The IHI Hangar System consists of a complete set of equipment for the airc maintenance shops of airlines.

In the system, a Body Dock is provi for fuselage maintenance, a Tail Dock the tail section, a Landing Gear Lift fo changing landing gear wheels, an overh crane for dismounting engines, and oth equipment, tools, and instruments req for aircraft maintenance.

IHI has delivered a Hangar System t Japan Air Lines where it is now in operation in the maintenance of the B 747 jumbo jets in JAL's fleet.



Hangar sys

It takes a certain kind of man to command the world's largest ship.

In 1973, IHI built the world's largest ship —
Globtik London, 483,939-DWT.
It takes a certain kind of company to build a ship that big.
And it takes a certain kind of man to sail her.
That man is Captain Colin Tyler.
He's been at sea for over thirty years.
What does Captain Tyler think about
the Globtik London?
"Regardless of its size, I can say that the
Globtik London is the best ship I've ever sailed on."
If larger ships were built, would Captain Tyler
like to command them?
"Yes, I would. I'm game for the big ones."
So is IHI.

Mammoth tanker "Globtik London"

Shipbuilding-I

WORLD SHIPBUILDING AND IHI

The Japanese shipbuilding industry has led the world in the amount of tonnage launched each year since 1956. According to Lloyd's Annual Summary for 1973, Japan launched 1,114 vessels aggregating 15,737,434 gross tons, or 50.4% of the world's total. Of this amount, IHI accounted for 41 vessels totaling 2,302,219 gross tons.

In order to build better ships, IHI has been pushing forward with the construction of large-sized ships and standardized ships at its six specialized shipyards. For example, in order to build super-large-sized ships efficiently, IHI completed construction of an 800,000 DWT dock at its Kure Shipyard. Also, its Chita Shipyard, equipped with the world's most up-to-date facilities, is capable of continuously building in one year four to five large-sized ships of the 260,000 DWT class, which is most in demand.

Furthermore, IHI has made much progress in developing highly economical marine engines including a gas turbine and is vigorously promoting the automation of ships to maintain its position of leadership in the world's shipbuilding industry.

MAMMOTH VESSELS

With completion of the 483,664 DWT "Globtik Tokyo", which surpassed in size the 372,400 DWT "Nisseki Maru", which was the world's biggest ship until 1973, IHI again rewrote the record for construction of mammoth tankers. During the term under review, a sister ship of the "Globtik Tokyo," the 483,939 DWT "Globtik London," was completed. The ship is presently in service on the same route as the "Globtik Tokyo" between the Arabian/Persian Gulf and Kiire, the central terminal station (CTS) of the Nippon Oil Group in Kagoshima, southern Japan. Carrying same 580,000 kiloliters of crude oil in one sailing, the "Globtik London" is fully demonstrating its capability as a super-mammoth tanker.

IHI also completed in the term under review three tankers of 268,000 DWT, 277,000 DWT and 226,000 DWT for World-Wide (Shipping) Ltd., Hong Kong. A 265,300 DWT ore/oil carrier, the "Jose Bonifacio", was completed for delivery to Petroleo Brasileiro S.A. This ship is one of the biggest ore/oil carriers in the world.

Noteworthy among orders received were those from National Bulk Carriers Inc. (NBC), a typical U.S. shipping and mining company, for four 445,300 DWT tankers and two 270,000 DWT tankers. IHI has delivered many ships to NBC, and the latest order brings to 29 vessels aggregating 6,172,000 DWT the total that IHI has completed or has on order for NBC. IHI has also received an order from Iraqi National Oil Company for a 144,000 DWT tanker, its first ship order from Iraq.

STANDARD SHIPS "FREEDOM" AND "FORTUNE"

By standardizing designs and types of ships, IHI has developed an epochal mass-production system under which a ship can be launched in 22 days. These standardized ships are of two types – the 14,800 DWT multi-purpose cargo carrier, the "Freedom" type, and the 22,000 DWT multi-purpose cargo carrier, the "Fortune" type. The ships have been much in demand for their low cost and high quality. As of March 1974, IHI had received orders for construction of 95 "Freedom" type ships and completed 88, and received orders for 41 "Fortune" type ships and completed 28.

During the term under review, IHI completed a "Fortune" type ship for Yugoslavia. Domestic orders included one for the Agricultural Cooperative Shipping.

THE NUCLEAR-POWERED SHIP "MUTSU"

IHI is also experienced in the construction of a nuclear-powered merchant ship.

It is the 8,200 gross-ton "Mutsu" built in 1970, the world's fourth nuclear-powered merchant ship. By taking on about 2.8 tons of enriched uranium as fuel, the ship can circle the globe seven times at a speed of 16.5 knots in two years without refueling.

The ship has been designed for safety to prevent any accidental leakage of harmful radiation. The techniques employed in the construction of this ship will prove their worth in the coming era of nuclear-powered ships.

SUPER-AUTOMATED SHIPS

IHI has established an outstanding record in the construction of automated ships that reduce labor requirements and improve operating safety and economy. In 1970, IHI built the world's first full-scale automated ship, the 138,000 DWT "Seiko Maru." This ship, a tanker, has computer systems for efficient, automatic control of everything from determining the position of the ship while at sea to preventing collisions, engine operation, computing the most economical way to load and unload cargos and even medical checkups for the crew.

This ship became the object of keen interest among world shipping circles upon its completion, but IHI further concluded a technical tie-up agreement with the Noratom-Norcontrol A/S of Norway on an automatic navigation system called the "DataBridge." It is composed of three sub-systems – a "DataRadar" to prevent collisions, a "DataSailing" to measure automatically the ship's position, and a "DataPilot" for automatic navigation. Many inquiries are expected for the system in future.

CONTAINER SHIPS

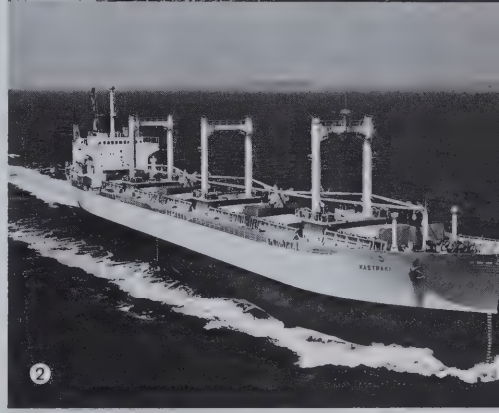
The demand for container ships has increased rapidly along with the progress made in rationalizing the transportation system. IHI has built many container ships including the 16,100 GT "Japan Ace" for the Japan Line and the 38,540 GT "Kiso Maru" for the Nippon Yusen Kaisha (NYK LIne).

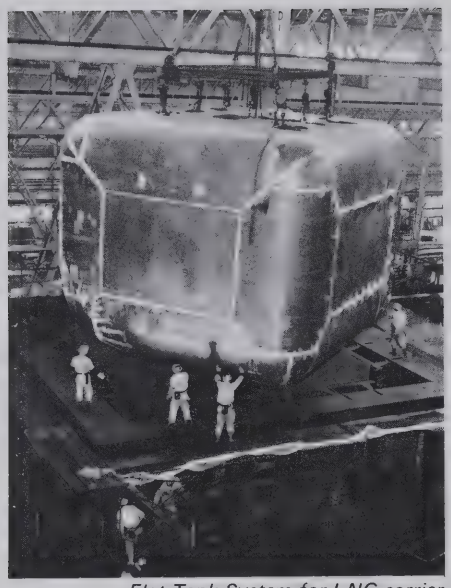
All the container ships so far built by IHI were for Japanese shipowners, but during the term under review, the first container ship for an overseas owner was completed – the 39,000 GT "Svendborg Maersk" for A/S D/S Svendborg, D/S 1912, A/S of Denmark. The ship has two main engines – 34,800 BHP IHI-Sulzer 12 RND 90 type diesels. It is capable of carrying 1,808 20-foot containers. Cruising speed is 27.5 knots.

One of IHI's latest container ships was built for the Kawasaki Kisen Kaisha (K Line), the "Lions Gate Bridge" (29,860 GT). It is capable of transporting 1,441 20-foot containers at a speed of 22.8 knots. The ships is presently on the trans-Pacific route.

Automatic navigation system "DataBridge"

① *Standardized multi-purpose cargo carrier "Fortune"*
② *Standardized multi-purpose cargo carrier "Freedom"*
③ *Nuclear-powered ship "Mutsu"*
④ *Computerized ship "Seiko Maru"*
⑤ *Containership "Kiso Maru"*





Flat Tank System for LNG carrier

LNG CARRIERS

The use of LNG has recently come into the limelight as a pollution-free source of energy. But the transportation of LNG is not possible with conventional tankers because it is necessary to keep the LNG at the extremely low temperature of $-162^{\circ}C$. In order to cope with this problem, IHI has developed with its own technology a new type of LNG carrier with a "Flat Tank System," which has greater reliability and is more economical than conventional LNG carriers of the self-standing type or membrane type.

This "Flat Tank System" was first made possible with the long experience and high technological skills of IHI, which has built land-based storage tanks for LNG and other low-temperature liquefied gases as well as tankers to transport LPG, ethylene and other low-temperature liquefied gases.

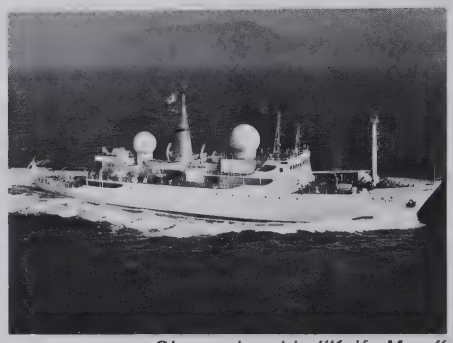
The first two LNG carriers built to the membrane tank design of Gaz Transport S.A.R.L. of France, the "Polar Alaska" and the "Arctic Tokyo" which are in service between Alaska and the LNG terminal of the Tokyo Electric Power Co. in Tokyo Bay, had their hulls repaired by IHI. During the term under review, however, IHI undertook the repair not only of their hulls but also their LNG tanks. This development attests to IHI's high technical standards concerning LNG carriers.

SPECIAL PURPOSE SHIPS

IHI also builds such special purpose ships as weather observation ships, oceanic research and observation ships, dredgers, motor boats and yachts, and naval vessels.

During the term under review, IHI completed construction of the "Harukaze Maru," a 360-ton oceanic and weather observation ship, for the Japanese Government Meteorological Agency. The ship is equipped with the latest facilities for observation and study of sea currents and weather conditions in the Pacific.

A 4,700 DT helicopter destroyer, the "Hiei" was launched by IHI for the Japanese Defense Agency. The vessel is presently being fitted out.



Observation ship "Keifu Maru"

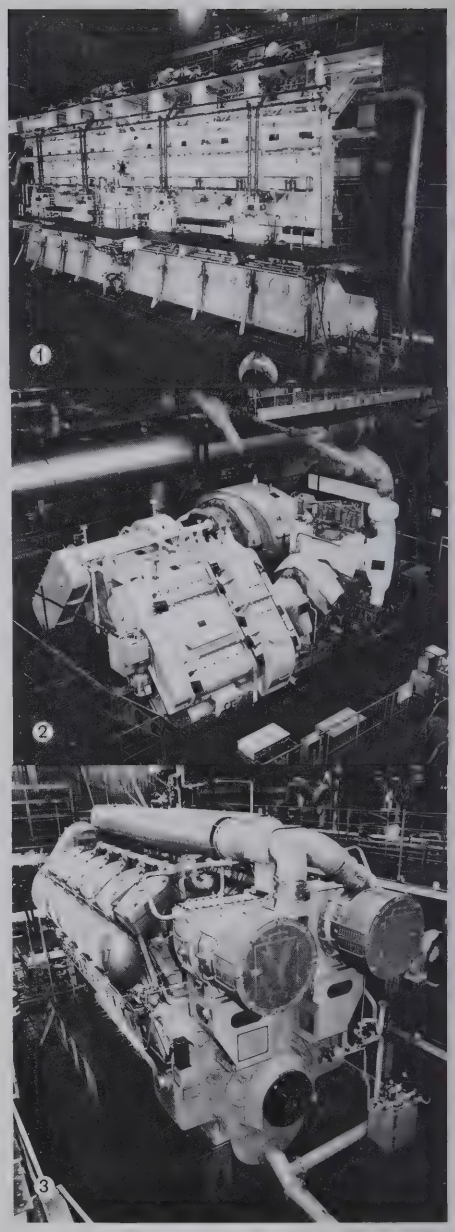
MARINE ENGINES

IHI produces turbines, diesel engines and boilers for marine use.

During the term under review, IHI built a 45,000 SHP steam turbine as the main engine for the 483,939 DWT tanker "Globtik London."

In diesel engines, IHI produces the large-size low-speed Sulzer engine and the medium-speed Pielstick engine. During the term under review, IHI produced 49 Sulzer engines totaling 800,350 BHP and 47 Pielstick engines totaling 330,155 BHP. In particular, IHI was the first in the world to top an aggregate of 7,000,000 BHP in the production of Sulzer engines, a most remarkable record.

Noteworthy in Pielstick engines was IHI's successful development of a new, medium-speed PC4 engine with bigger power output in a joint project with S.E.M.T. of France. Compared to the PC2-5 engine now in production and which has a per cylinder power output of 650 BHP the new PC4 engine has more than double the power per cylinder of 1,500 BHP. The PC4 engine is in answer to the expectations of shipping and shipbuilding circles for a more powerful medium-speed diesel engine. The first PC4 engine to come off the production line was put to practical application at the independent electric power plant of IHI's Aioi No. 2 Works. It is the biggest single diesel power plant in Japan, developing 12,800 kilowatts.



① *Sulzer type diesel engine*
② *Turbine engine*
③ *Pielstick type diesel engine*

Sometimes the people who build big ships get kind of sad.

Building a great ship isn't like working on an assembly line. You spend months planning. You lay the keel. You build slowly, carefully, with all your skills. You launch her, and you have a party. Then you watch her sail away.

The thousands of people who build great ships for IHI have a personal feeling towards each ship they build.

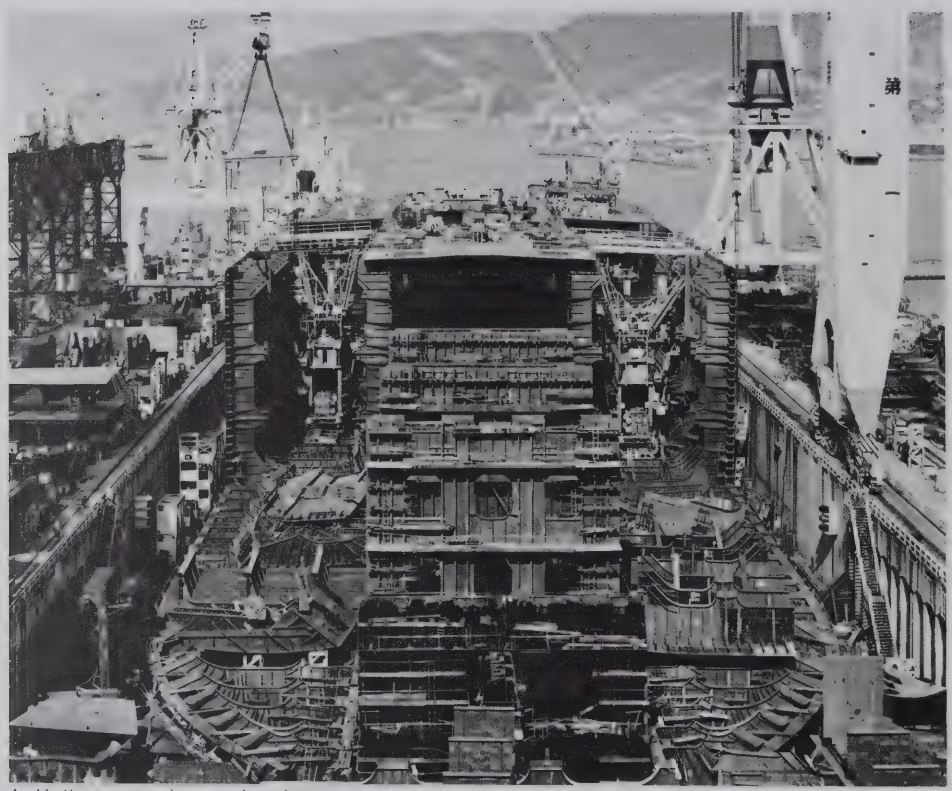
That's one of the reasons they build them so well.

Shipbuilding–II

HOW A SHIP IS BUILT – STEPS IN CONSTRUCTION

1. STRUCTURAL TESTS, WATER TANK TESTS

To determine the safety and performance of a ship to be built, exhaustive studies and tests must first be made of its materials, structure, and other aspects. After all these aspects are rigorously tested and studied, the basic ship designs, from shape, longitudinal strength, trim and heel, to power of engine and shape of propellers are decided on.



▲ *Hull construction work unit*

▼ *Ship model tank*

2. DETAILED DESIGN

When the basic ship design has been decided on, the ship architects and engineers start work on expanding the basic design into detailed designs, followed by the final calculation. Today, computers do much of the work of calculation and detailed design. IHI has developed and uses an integrated system of ship design calculations.

At IHI, computer-linked Numerical Control (NC) Drafters are widely used to draw the blueprints and do the work automatically, accurately and speedily.

3. FABRICATING THE STEEL

The steel that goes into a ship hull consists of such types of steel products as plates, sheets, structural shapes and pipes. The steel material is marked exactly as specified in the blueprints and precisely cut and bent.

To increase accuracy and speed in work, electronic-photographic marking devices mark the blueprint lines automatically and exactly on the steel plates, NC flamecutters cut the plates, and NC benders bend the pipes and other materials.

4. BLOCK ASSEMBLY

The fabricated materials are welded and assembled into blocks, the units that, put together, form the ship.

In the past, a ship hull, after launching, was towed to a fitting-out pier where the engine plant and other machinery, pipes and ducts, electrical systems, and other fittings were built into the ship. Today, fittings such as pipes and valves are built in so far as possible at the block assembly stage. This method is called pre-outfitting. Equipment and fittings for the engine and pump rooms are assembled in a workship into large units and then installed in the ship. This method is called unit outfitting.

5. ASSEMBLY IN BUILDING DOCK OR ON BUILDING SLIP

The assembled blocks are taken to the building dock or building slip for assembly into the ship. In the assembly process, as the ship gradually takes form, work starts with the engine room of the stern section, which involves extensive fitting-out.

The process of welding the blocks together in assembly, called the block construction method, greatly raises work efficiency.

For the work of assembly in the building dock or on the building slip, IHI has developed the Hull Construction Work Unit. The unit resembles somewhat a fire engine ladder truck used for fighting fires in buildings. It has movable scaffold platforms adjustable as desired, hydraulic

tools, automatic welders, various types of motive power, lighting devices, test-instruments — a complete set of equipment and capabilities required for assembly work. The unit can even run under its own power on rails laid inside the ship. It raises work efficiency and safety immeasurably, and also shortens the construction period to effect a broad rationalization of operations.

6. LAUNCHING

When the ship hull is completed, X-ray and numerous other tests are conducted, after which the job of painting starts. Upon finishing of the paint job, the ship is ready for launching. If the ship is built on a slip, it slides into the water in the traditional fashion. If it is built in a dry dock, water is let into the dock and the floating ship towed out.

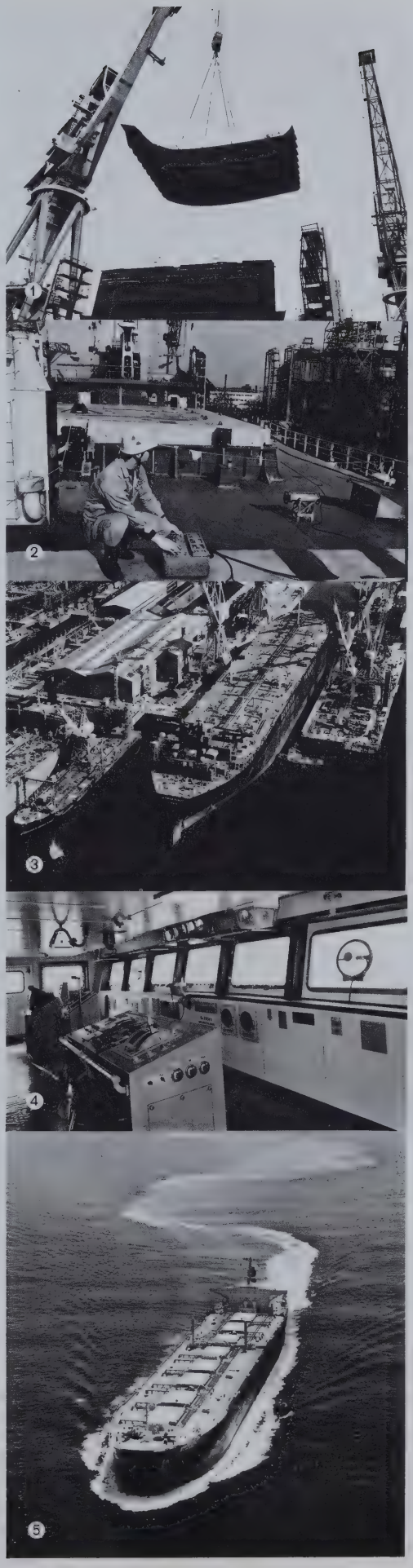
7. FINAL FITTING-OUT

The ship hull after launching is tied up to the fitting-out pier. Here, electrical systems, radio communications facilities, lighting equipment, and other fittings are installed in the ship.

IHI at its newest and most modern dockyard, the Chita Shipyard, uses the latest and most advanced fitting-out methods in which the final outfitting work can be carried out within a dock.

8. TRIAL RUNS

Although the ship has been built exactly to design specifications, its safety and performance must be confirmed by trial runs. Representatives of the shipowner, government agencies having jurisdiction, and the Ship Classification Society are present for the official test runs for tests of speed, turning performance, vibration, rolling and pitching, and all other aspects of safety and performance. Not until a ship has fully passed its test runs is it considered completed.



① *Erection work*
② *X-ray inspection*
③ *Launching*
④ *Final fitting-out*
⑤ *Sea trial*

When we set up a joint venture, we're not afraid to get our hands dirty.

To some big companies, a joint venture means "our money, your hard work."
IHI isn't like that. When we set up a joint venture, we get involved. All the way.
In Singapore, for example, IHI helped establish a shipyard. We planned. We solved problems.
And now, that shipyard can repair nearly five million tons of shipping every year.
We're just as involved with our many other joint ventures around the globe.
After all, if you don't get your hands dirty, you don't get anything done.

Overseas Aid

IHI provides not only plants and equipment but also its superior technology to various countries of the world.

For example, IHI cooperated wholeheartedly with Italy's Cantiere Navale Breda S.p.A. on the building of facilities for construction of super large-size ships. IHI provided everything from drawing up the layout for the dock and workshops to consultations on construction, supplying the blueprints for the ships to be built and even the sending of technicians to instruct and supervise the Italian workers.

Overseas trainess aboard ship

During the term under review, IHI also supplied know-how on a "unit fitting-out method" to ITALCANTIERI, S.p.A. Italy's biggest shipbuilder. Under this method, the numerous ship fittings are first prefabricated into units in the workshops or yards and then installed as work on the ship hull progresses. It makes possible a tremendous improvement in work efficiency, precision of operations and safety. IHI's ties of friendship have been further cemented in the same way by the provision of know-how on a "hull construction work unit" to the Italian shipbuilder.

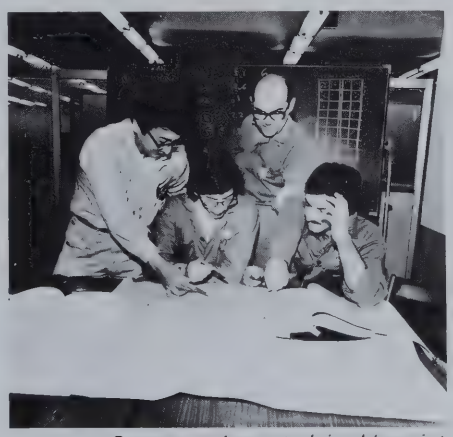
IHI also supplied know-how on a planetary gear device to Lohmann and Stolterfoht AG of West Germany for use with main, medium-speed, marine diesel engines installed in single-screw vessels. Compared with conventional reduction gears, the new gear features arrangement of input and output shafts placed on the same line. It is smaller, lighter in weight, and easy to install. Lohmann and Stolterfoht AG is one of West Germany's leading gear manufacturers whose products are known worldwide for reliability, and the fact that such a company imported this device attests to IHI's high technological level.

Domestically, IHI extended technical know-how during the term under review to the Hashihama Shipbuilding Co., for construction of a new, large shipbuilding yard. The new yard will raise the shipbuilding capacity of the company from building ships of the 10,000-ton to 15,000-ton class to the 60,000 GT class. In building the new yard, IHI supplied plans for the layout, advice on its construction, blueprints for the ships to be built, and guidance and instruction of workers.

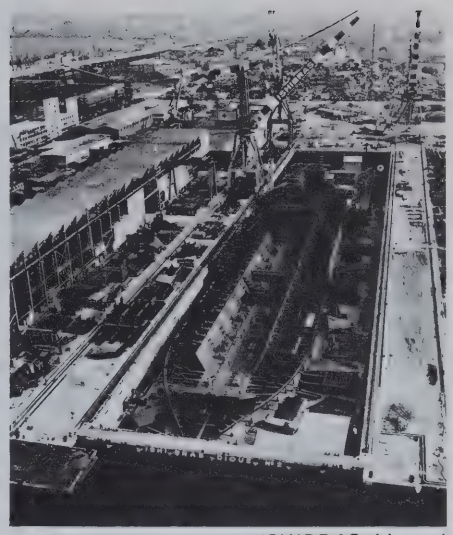
IHI supplies not only the blueprints but also the materials necessary to make products.

During the term under review, IHI received orders for a package deal and material to build four tankers of 445,000 DWT each from the China Shipbuilding Company (CSBC), and another order for a package deal and material to build a 98,000 DWT tanker, from the Jurong Shipbuilders Private Ltd. (JSBL).

IHI has also established joint ventures abroad to contribute directly to the economic development of other countries. In Brasil, there is the Ishikawajima do Brasil Estaleiros S.A. (ISHIBRAS). When it was first established, the company had only a 25,000-ton dock. Today, it is the largest shipbuilding yard in Central and South America, capable of building 130,000 DWT class tankers in its 400,000-ton dock. The shipyard celebrated the 15th anniversary of its founding during the business term under review. Great hopes are entertained for its further development.



Overseas trainees studying blueprint



ISHIBRAS shipyard

In Singapore, IHI established with the Singapore Government in 1963 a joint venture — the Jurong Shipyard Ltd. (JSL). JSL has a 300,000-ton repair dock capable of repairing 4,800,000 GT a year. Another joint venture, Jurong Shipbuilders Private Ltd. (JSBL) was established by IHI, JSL, and the Singapore Government in 1968. JSBL is aggressively tackling the task of building ships. In 1971, the company laid the keel for construction of its first ship. Since then, it has built 11 "Freedom" type ships, 14,800-ton multi-purpose cargo carriers. During the term under review, JSBL received orders from the Palm Star Line of Singapore for three 91,600 DWT tankers, and from the Neptune Alpha Line an order for one vessel of the same type and tonnage, and from the Greek shipowner B.P. Goulandris Group another order for two 91,600 DWT tankers. JSBL thus looks forwards to ever greater expansion in future.

IHI's Overseas Office and Service Network


CANADIAN VICKERS LTD. (CANADA)
TODD SHIPYARDS CORP. (U.S.A.)
NEW YORK
SAN FRANCISCO
MEXICO CITY
LIMA
METAL EMPRESA S.A. (PERU)
BELO HORIZONTE
ISHIBRAS (BRASIL)
RIO DE JANEIRO
BUENOS AIRES
IHI OVERSEAS OFFICES
JOINT VENTURES
IHI'S SERVICE NETWORK

Specialized Works of IHI

SHIPYARDS

Tokyo Shipyard

2-chome, 1-1, Toyosu, Koto-ku, Tokyo, Japan
Telephone: (03) 531-5111

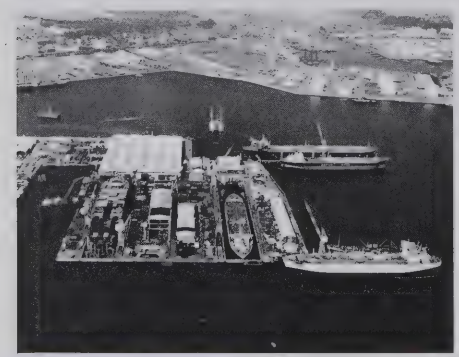
Products Medium sized ships and naval craft of various types.
Area of site 182,028 m^2
Floor space 67,985 m^2

Building Berths

No.	Length	Breadth	Capacity
1	175.00m	25.00m	15.000GT
5	225.00m	36.30m	45.600GT

Repair Dock

No.	Length	Breadth	Depth	Capacity
1	138,00m	19.50m	7.27m	7,000GT
2	180.00m	24.00m	7.24m	16,750GT



Yokohama Shipyard

12, Shin-Sugita-cho, Isogo-ku, Yokohama, Japan
Telephone: (045) 751-1231

Products Large ships of various types.
Area of site 413,550 m^2
Floor space 89,578 m^2

Building Dock

No.	Length	Breadth	Depth	Capacity
1	330,00m	52.00m	11.00m	120,500GT

Repair Dock

No.	Length	Breadth	Depth	Capacity
1	358,00m	56.00m	12.50m	161,000GT

Nagoya Shipyard

13, Chowa-machi, Minato-ku, Nagoya, Japan
Telephone (052) 611-3111

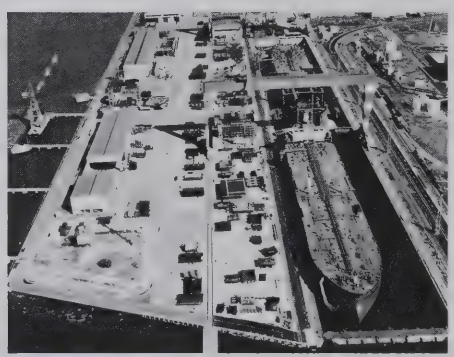
Products Medium sized ships and machinery of various types.
Area of site 194,573 m^2
Floor space 65,100 m^2

Building Berths

No.	Length	Breadth	Capacity
2	222.00m	36.60m	38,000GT
4	196.00m	24.00m	17.000GT

Repair Dock

No.	Length	Breadth	Depth	Capacity
1	156.00m	23.60m	6.02m	13,000GT



Chita Shipyard

11-1, Kitahama-cho, Chita, Aichi-ken, Japan
Telephone: (0562) 32-8020

Products Large ships of various types.
Area of site 766,763 m^2
Floor space 121,476 m^2

Builidng Dock

No.	Length	Width	Depth	Capacity
1	810.00m	92.00m	14.00m	250,000GT

Aioi Shipyard

5292, Aioi, Aioi-shi, Hyogo-ken, Japan
Telephone: (07912) 2-3111

Products Large ships of various types.
Area of site 627,200 m^2
Floor space 100,338 m^2

Building Berths

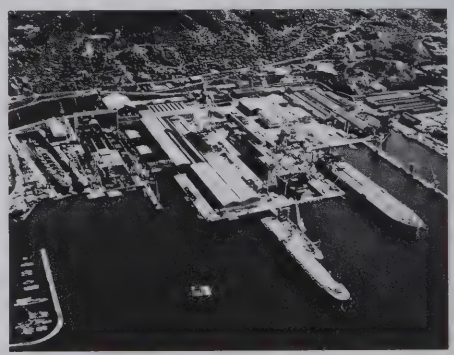
No.	Length	Breadth	Capacity
2	253.90m	35.70m	48,500GT
3	287.00m	46.00m	91,000GT

Repair Docks

No.	Length	Breadth	Depth	Capacity
1	238.10m	35.00m	9.07m	43,300GT
2	151.54m	20.70m	6.42m	9,600GT
3	340.00m	56.00m	8.00m	150,000GT

No. 1 Building Berth closed in December, 1973 and No. 2 Building Berth will close in March, 1975. On the site of these two building berths, No. 1 New Building Dock is being constructed and scheduled to commence its operation in March, 1975.

	Length	Breadth	Capacity
No. 1 New Building Dock	280.00m	60.00m	95,000GT



Kure Shipyard

2-chome, 1, Showa-dori, Kure-shi, Hiroshima-ken, Japan Telephone: (0823) 22-5151

Products Large ships of various types.
Area of site 389,198 m^2
Floor space 134,257 m^2

Building Docks

No.	Length	Breadth	Depth	Capacity
2	342.93m	65.00m	11.15m	180,000GT
3	510.00m	80.00m	8.96m	251,000GT

Repair Dock

No.	Length	Breadth	Depth	Capacity
4	334.10m	43.93m	17.00m	90,000GT

LAND MACHINERY WORKS

Tokyo No. 1 Works
2-chome, 1-1, Tsukuda, Chuo-ku, Tokyo, Japan
Telephone: (03) 531-8111

Products Pneumatic and hydraulic machinery, paper manufacturing machinery, transportation and cargo handling machinery, steel structures, construction machinery and chemical machinery.
Area of site 102,583 m^2
Floor space 59,304 m^2

Tokyo No. 3 Works
3-chome, 1-15, Toyosu, Koto-ku, Tokyo, Japan
Telephone: (03) 531-5111

Products Marine turbines, machinery and equipment for chemical industry, chemical plants and its equipment, cast products.
Area of site 123,689 m^2
Floor space 80,113 m^2

Aioi No. 2 Works
5292, Aioi, Aioi-shi, Hyogo-ken, Japan
Telephone: (07912) 2-3111

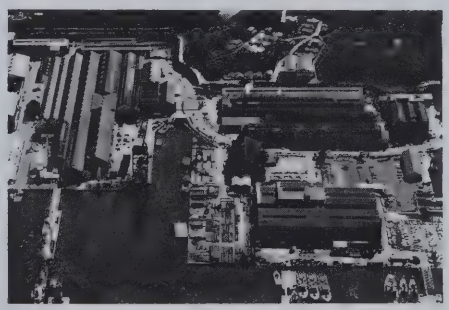
Products Diesel engines, boilers, chemical plants and its equipment, construction machinery, steel structures.
Area of site 359,831 m^2
Floor space 127,855 m^2

Yokohama No. 1 Works
Shin-Nakahara-cho, Isogo-ku, Yokahama, Japan
Telephone: (045) 751-1231

Products Iron and steel making machinery, presses, molding and processing machines.
Area of site 164,366 m^2
Floor space 62,366 m^2

Yokohama No. 3 Works
Shin-Nakahara-cho, Isogo-ku, Yokohama, Japan
Telephone: (045) 751-1231

Products Chemical plants, pressure vessels, reactor containment vessels and heat exchangers for nuclear power plants and industrial furnaces.
Area of site 161,863 m^2
Floor space 60,833 m^2



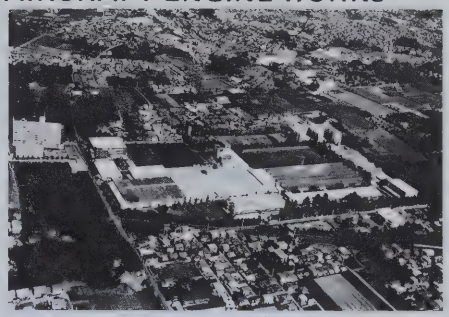
Kure No. 2 Works
2-chome, 1, Showa-dori, Kure-shi, Hiroshima-ken, Japan Telephone: (0823) 22-5151

Products Packaged boilers, machinery for chemical industry.
Area of site 27,691 m^2
Floor space 57,261 m^2

Kure Shingu Works
5-17, Hikari-machi, Kure-shi, Hiroshima-ken, Japan Telephone: (0823) 22-2345

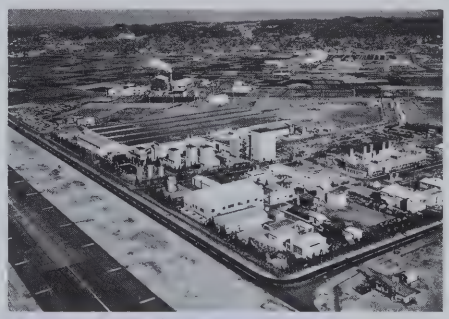
Products Bridges, steel structures, machinery for chemical industry.
Area of site 74,923 m^2
Floor space 35,945 m^2

AIRCRAFT ENGINE WORKS



Tanashi Aircraft Engine Works
3-chome, 5-1, Mukodai-machi, Tanashi, Tokyo, Japan Telephone: (0424) 66-1536

Products Aircraft jet engines and gas turbines.
Area of site 93,407 m^2
Floor space 67,717 m^2



Mizuho Aircraft Engine Works
229,Ohaza Tonogaya Dotemukai, Mizuho-cho, Nishi-Tama-gun, Tokyo, Japan
Telephone: (0425) 57-1111

Products Aircraft jet engines and gas turbines.
Area of site 88,483 m^2
Floor space 19,626 m^2

Board of Directors

Chairman of the Board

Renzo Taguchi

President

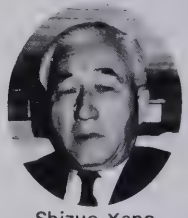
Hisashi Shinto

Executive Vice Presidents

Osamu Nagano

Giroku Fujii

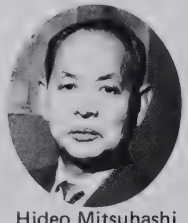
Kiyoshi Okubo



Shizuo Yano

Managing Directors

Morio Saigusa



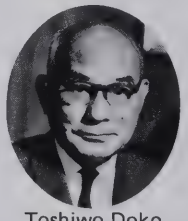
Hideo Mitsuhashi

Kiyoto Urakawa

Takeshi Yokota

Michiyasu Nasaka

Director & Counselor



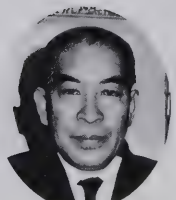
Toshiwo Doko

Directors

Masao Koyama

Yoshitaka Sawanobori

Directors



Tadaaki Mori

Hirotaro Nemoto

Tadashi Matsudaira

Yoshitane Yokote

Kaneichiro Imai

Kosaku Inaba

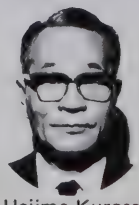
Hideo Kamijo

Keizo Tamaki

Kazuo Iwata

Auditors

Masashi Makino



Hajime Kurose

Financial Statements for the Year

ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES CO., LTD.
BALANCE SHEET for the Year Ended March 31, 1974

ASSETS	In millions of yen		In thousands of U.S. dollars	
	1973	1972	1973	1972
CURRENT ASSETS:				
Cash (including time deposits)	74,817	84,704	274,256	310,499
Marketable securities, at cost or less	68,202	77,023	250,007	282,342
Notes receivable	64,951	46,716	238,090	171,246
Accounts receivable	361,350	367,941	1,324,597	1,348,757
Raw materials, at cost or less	11,973	8,194	43,889	30,037
Contracts in process	258,171	179,489	946,375	657,951
Advances to suppliers	35,973	27,399	131,866	100,436
Prepaid expenses and other current assets	18,645	11,086	68,347	40,638
Less allowance for doubtful accounts	(–) 6,125	(–) 6,072	(–) 22,452	(–) 22,258
Total current assets	887,957	796,480	3,254,975	2,919,648
FIXED ASSETS:				
(Tangible fixed assets)	(130,306)	(116,633)	(477,661)	(427,541)
Land	16,516	16,118	60,543	59,084
Buildings	52,354	43,687	191,913	160,143
Machinery and equipment	48,789	44,418	178,845	162,823
Construction in process	12,647	12,410	46,360	45,491
(Intangible assets)	(774)	(756)	(2,837)	(2,771)
Patents and others	774	756	2,837	2,771
(Investment)	(90,531)	(66,716)	(331,859)	(244,560)
Shares — subsidiaries	22,983	20,362	84,249	74,641
Other investments	67,548	46,354	247,610	169,919
Total fixed assets	221,611	184,105	812,357	674,872
DEFERRED CHARGES:				
Unamortized bond-issuing expenses and others	1,586	1,506	5,814	5,521
TOTAL ASSETS	1,111,154	982,091	4,073,146	3,600,041

NOTE 1.
This financial statement, which has been compiled in accordance with Japanese accounting regulations, is expressed in yen and, solely for the convenience of the reader, has been translated into United States dollars at the rate of ¥272.80=US$1, T.T.B. rate prevailing on March 31, 1974. This translation should not be construed as a representation that all the amounts shown could be converted into U.S. dollars. The comparative figures presented in U.S. dollars for the year ended March 31, 1973, which were translated at the rate of ¥264.90=US$1 in previous reports, are translated at the rate used to translate the March 31, 1974 statements, i.e. ¥272.80=US$1.

NOTE 2.
Monetary assets and liabilities in foreign currencies have been evaluated in yen as follows:
(1) Short term monetary assets and liabilities falling due within one year on and after the following day of the date of the settlement of this balance sheet have been evaluated in yen at the exchange rate prevailing on the

LIABILITIES AND CAPITAL

	In millions of yen		In thousands of U.S. dollars	
	1973	1972	1973	1972
CURRENT LIABILITIES:				
Short-term borrowings	222,875	209,387	816,990	767,548
Notes payable	77,365	54,746	283,596	200,682
Accounts payable	52,949	40,225	194,095	147,452
Accrued expenses	21,732	18,091	79,663	66,316
Advances from customers	242,313	193,931	888,244	710,891
Other current liabilities	48,967	30,797	179,498	112,892
Total current liabilities	666,201	547,177	2,442,086	2,005,781
LONG-TERM LIABILITIES:				
Long-term borrowings	323,115	332,606	1,184,439	1,219,230
Other debts	116	140	425	513
Total long-term liabilities	323,231	332,746	1,184,864	1,219,743
RESERVES:				
Employees' retirement benefits	18,775	16,112	68,823	59,062
Overseas markets development and others	28,723	18,610	105,290	68,218
Total reserves	47,498	34,722	174,113	127,280
TOTAL LIABILITIES	1,036,930	914,645	3,801,063	3,352,804
CAPITAL STOCK:				
Capital stock	41,391	40,157	151,727	147,203
SURPLUS:				
Capital surplus	5,849	4,162	21,441	15,257
Legal reserve	5,363	4,903	19,659	17,973
Retained earnings	21,621	18,224	79,256	66,804
TOTAL CAPITAL	74,224	67,446	272,083	247,237
TOTAL LIABILITIES AND CAPITAL	1,111,154	982,091	4,073,146	3,600,041

date of the balance sheet. (i.e. T.T.B. rate ¥272.80=US$1 for the assets and T.T.S. rate ¥274.80=US$1 for the liabilities).

(2) Long-term monetary assets and liabilities falling due beyond one year from the following day of the date of this balance sheet have been evaluated in yen according to the exchange rate on the date booked of each amount.

NOTE 3.
Amounts of long-term monetary assets and liabilities evaluated in such manner as above item (2) are as follows:
Monetary assets ¥127,605 million (US$377,438 thousand)
Monetary liabilities ¥23,630 million (US$78,469 thousand)

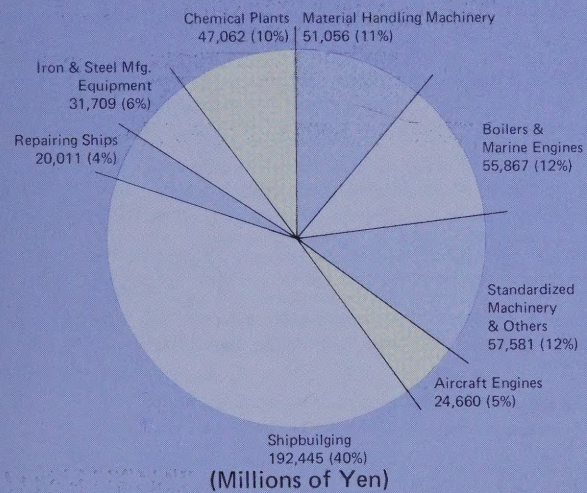
ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES CO., LTD.
INCOME STATEMENT for the Year Ended March 31, 1974

	In millions of yen		In thousands of U.S. dollars	
	1973	1972	1973	1972
Net Sales	480,391	435,495	1,760,964	1,596,389
Cost of sales	423,404	390,291	1,552,068	1,430,685
OPERATING PROFIT	56,987	45,204	208,896	165,704
Non-operating Income:				
Interest and dividends	31,977	28,318	117,218	103,805
Other income	3,775	6,933	13,838	25,414
Non-operating Expenses:				
Interest	38,056	35,296	139,501	129,384
Other expenses	7,296	8,150	26,745	29,875
RECURRING PROFIT	47,387	37,009	173,706	135,664
SPECIAL PROFIT:				
Reversal of reserve for foreign exchange loss	0	3,913	0	14,344
SPECIAL LOSS:				
Loss on foreign exchange	11,083	18,580	40,627	68,109
Special depreciations	835	882	3,061	3,233
Deferred profit on installment sales	9,951	9,621	36,477	35,268
Reserve for foreign exchange loss	9,700	7,265	35,557	26,631
INCOME BEFORE INCOME TAXES	15,818	4,574	57,984	16,767
Income taxes	7,450	0	27,310	0
NET INCOME FOR THE YEAR	8,368	4,574	30,674	16,767
RETAINED EARNINGS:				
Balance at beginning of the year	18,224	17,980	66,804	65,909
(Deduct)				
Cash dividends paid	4,454	3,886	16,327	14,245
Officers' bonus paid	57	44	209	161
Transfer to legal reserve	460	400	1,686	1,466
BALANCE AT END OF THE YEAR	21,621	18,224	79,256	66,804

NOTE 1.
Special depreciations indicate depreciations made exceeding regular depreciation in accordance with a special provision of the Japanese tax law.

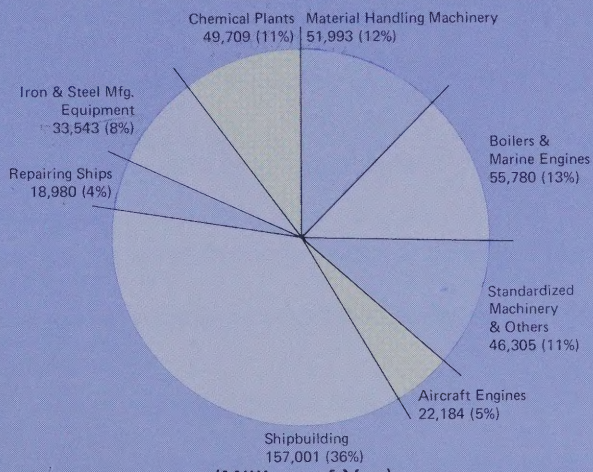
NOTE 2.
Sales of contract jobs delivered to clients in the following periods have been evaluated in yen at the average rate of each period:
on and after April 1, 1972 to September 30, 1972 (¥301.47=US$1);
on and after October 1, 1972 to February 13, 1973 (¥300.31=US$1);
on and after February 14, 1973 to March 31, 1973 (¥265.31=US$1);
on and after April 1, 1973 to September 30, 1973 (¥264.03=US$1);
on and after October 1, 1973 to March 31, 1974 (¥281.26=US$1).

Net Sales 1973 — ¥480,391 million



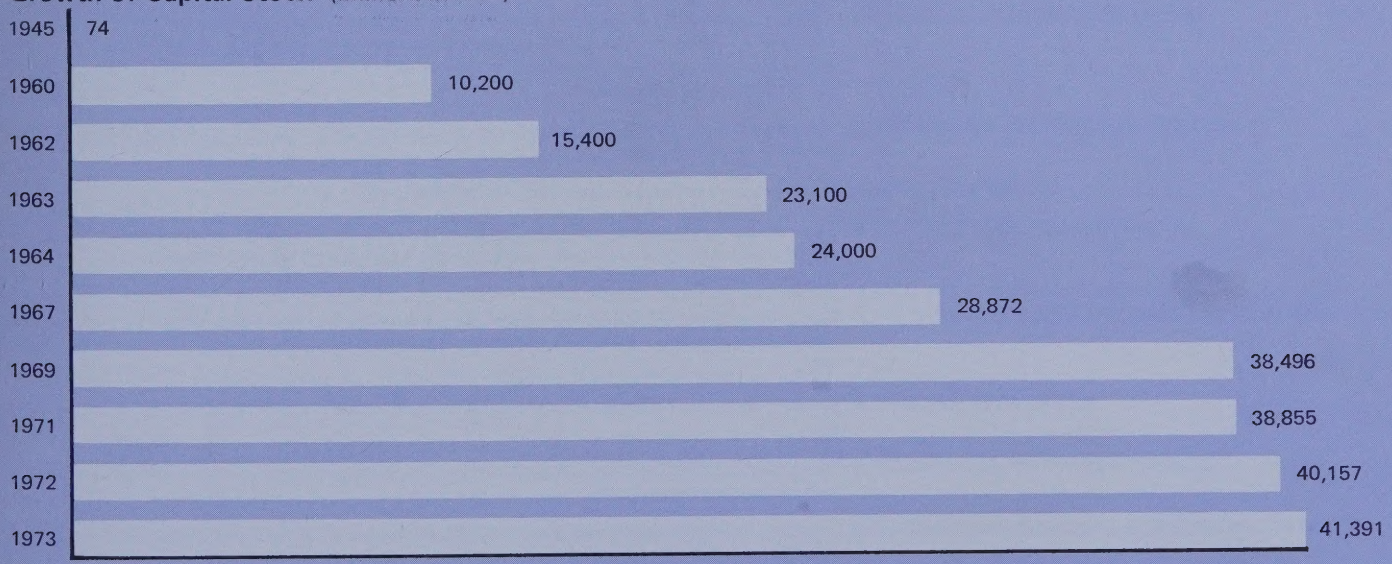
(Millions of Yen)

Net Sales 1972 — ¥435,495 million



(Millions of Yen)

Growth of Capital Stock (Millions of Yen)



(Fiscal Year)

Main Lines of Business

SHIPS ■ Building, remodelling and repairing of cargo ships, cargo liners, bulk carriers, ore carriers, tankers, products carriers, combination carriers, LPG tankers, ethylene tankers, container ships, Freedom ships, Fortune ships, nuclear-powered ships, passenger ships, passenger and cargo ships, dredgers, floating cranes, tug boats, motor boats and other specific type vessels

LAND AND MARINE ENGINES ■ Marine steam turbines, Sulzer type diesel engines, Pielstick type diesel engines, gas turbines, hydro-jets, marine boilers and other auxiliary machinery

GEARS ■ Gears, planetary gears, various gears, gear equipment, etc.

BLAST FURNACES ■ Blast furnaces and auxiliary equipment, valve seal type high top pressure blast furnaces and auxiliary equipment, etc.

INDUSTRIAL FURNACES ■ Converters, mixers, mixer cars, arc furnaces, walking-beam type heating furnaces, soaking pits, plate heat-treating furnaces, annealing furnaces, etc.

ROLLING MILLS ■ Blooming mills, slabbing mills, billet mills, plate mills, hot strip mills, cold strip mills, skinpass mills, temper mills, bar mills, rod mills, planetary mills, tube mills, pipe mills, rolling mills for nonferrous metals, levellers, hot saw, slitter lines, flying shear lines, etc.

INDUSTRIAL MACHINERY ■ Danly type mechanical presses, Schloemann type hydraulic presses, extrusion presses, blanking lines, rim lines, roller levellers, pipe benders, press benders, cold roll molding machines and other metal processing machines

STEAM GENERATORS AND ELECTRIC POWER ■ FW type boilers, Sulzer type mono-tube boilers, water-tube package boilers, smoke-tube package boilers, mono-tube package boilers, exhaust gas heaters, oil burners, etc.

NUCLEAR POWER EQUIPMENT AND APPARATUS ■ Reactor pressure vessels, reactor containment vessels, heat exchangers, radioactive isotope manufacturing and handling equipment, radioactive scrap disposal equipment, nuclear fuel redisposal equipment, etc.

CHEMICAL PROCESSING PLANTS ■ Oil refinery plants, petro-chemical plants, chemical fertilizer plants and other chemical processing plants

CHEMICAL INDUSTRY MACHINERY AND EQUIPMENT ■ Reactors, towers and vessels, low-temperature storage tanks, spherical tanks, floating roof tanks, gas folders, heat exchangers, air-cooled heat exchangers, cooling towers, fired heaters, evaporators, crystalizers, spray-dryers, etc.

TRANSPORTATION MACHINERY ■ Loaders, unloaders, shiploaders, stackers, reclaimers, conveyors, container cranes, pneumatic unloaders, bucket-wheel unloaders, overhead travelling cranes, cranes for iron and steel mills, jib cranes, level luffing cranes, gantry cranes, winches, deck cranes, tower parking facility, etc.

POLLUTION CONTROL EQUIPMENT ■ Mechanical and electric dust collecting equipment, water treating equipment, steel stacks desulphurizing equipment, etc.

SEPARATORS ■ Continuous centrifugal separators, funda filters, etc.

BLOWERS AND COMPRESSORS ■ Centrifugal compressors and blowers, axial flow compressors and blowers, balance-opposed compressors and blowers, turbo-refrigerators, Joy type stationary compressors, small compressors, etc.

CIVIL ENGINEERING CONSTRUCTION MACHINERY ■ Boring machines, bucket-wheel excavators, tunnel boring machines, shield tunneling machines, diesel pile hammers, steam pile hammers, stationary concrete pumps, mobile concrete pumps, etc.

STEEL STRUCTURES ■ Bridges, steel structures, steel towers, gates, penstocks, aircraft hangar body docks, silencers, etc.

CEMENT INDUSTRY EQUIPMENT ■ Dry process cement plants, wet process cement plants, cement kilns, air blending silos, calcination equipment, etc.

PLASTIC AND RUBBER MOLDING MACHINERY ■ Injection molding machinery, blow molding machinery, extrusion molding machinery, hot presses, calenders, rotocures, etc.

PULP AND PAPER MANUFACTURING MACHINERY ■ Pulp mill equipment, paper recovery equipment, stock preparation machinery, fourdriniers, cylinder board machines, coating machines, laminating machines, etc.

HEATING EQUIPMENT ■ Hot-water boilers, hot-air furnaces, etc.

SUPERCHARGERS ■ Exhaust gas turbo-chargers, continuous centrifugal separators, etc.

AIRCRAFT ENGINES ■ Manufacturing and repairing of turbo-jet engines, turbo-prop engines, turbo-shaft engines etc.

AGRICULTURAL MACHINERY ■ Tractors, tillers, combines, planting machines, harvesting machines, air-cooled gasoline engines, vacuum cars, etc.

FORGING AND CASTING ■ Forgings, meehanite metals, precision castings, etc.

IHI Offices

HEAD OFFICE ■ New Ohtemachi Bldg., 2-chome, 2-1 Ohtemachi, Chiyoda-ku, Tokyo, JAPAN
Tel: Tokyo (03) 244-6496 Telex: J22232 (IHICO J22232), J22388 (IHICO J22388), J22490 (IHICO J22490), J24239 (IHICO J24239)
Cable Address: IHICO TOKYO

NEW YORK ■ Suite 1101, One World Trade Center, New York, N.Y. 10048, U.S.A.
Tel: 432-0330, 0331, 0332 Telex: 232670 (232670 IHI UR), 420539 (420539 IHI UI)
Cable Address: IHICONO NEWYORK

SAN FRANCISCO ■ Room 1204, Merchants Exchange Bldg., 465 California Street, San Francisco 94104, California, U.S.A.
Tel: 986-2262, 2263, 989-2198, 2213 Telex: 278792 (278792 IHICO UR)
Cable Address: IHICO SANFRANCISCO

MEXICO CITY ■ Paseo de la Reforma No. 30, 4 piso, Mexico 1, D.F., MEXICO.
Tel: 535-5207, 535-5216 Telex: 01772560 (TOSHIBA MEX)
Cable Address: IHIHEAVY MEXICO

LIMA ■ Las Begonias 441, Room No. 339, San Isidro, Lima, PERU P.O. Box. No. 3188-Lima
Tel: 40-2275, 3165 Telex: PX5652 (PX5652 IHI LIMA)
Cable Address: IHICO LIMA

RIO DE JANEIRO ■ Avenida Presidente Antonio Carlos 607, Sobreloja, Rio de Janeiro Guanabara, BRASIL
Tel: 231-1975, 0090 Telex: 731-517 (IHICO RIO)
Cable Address: ISHIBRAS RIODEJANEIRO

BUENOS AIRES ■ Edificio "SAFICO" Avenida Corrientes 456, Septimo (7) Piso, Oficina 71, Buenos Aires, ARGENTINA
Tel: 46-9081 Telex: 012-1948 (121948AR IHICO)
Cable Address: IHICONO BUENOSAIRES

LONDON ■ Europe House, World Trade Centre, London, E1 9AA, ENGLAND
Tel: 709-9493 ~ 9 Telex: 888377 (IHICO LONDON), 883786 (IHICO LONDON)
Cable Address: IHICO LONDON E1

OSLO ■ Huitfeldts Gate 15, Oslo 1, NORWAY
Tel: 444024, 566059 Telex: 16486 (16486 IHICO N)
Cable Address: IHICO OSLO

DUESSELDORF ■ 4000 Duesseldorf, Heinrich-Heine-Allee 33, WEST GERMANY
Tel: 14051, 14052 Telex: 8588334 (8588334 IHI D)
Cable Address: IHICO DUESSELDORF

ROTTERDAM ■ Flatgebouw "MERCATOR" Glashaven 10a, Rotterdam-3001, NETHERLANDS
Tel: 010-116406 Telex: 22462 (22462 IHI NL)
Cable Address: IHICO ROTTERDAM

VENICE ■ c/o Cantiere Navale Breda S.p.A, Via Della Industrie 18, Venezia-Marghera, ITALY
Tel: 041-958686 Telex: 41435 (41435 IHICO VEN)

GREECE ■ 3rd Floor, No. 7 Akti Miaouli Street, Piraeus, GREECE
Tel: 426583, 426584 Telex: 212483 (212483 IHI GR),
Cable Address: IHICOSHIP PIRAEUS

BEIRUT ■ Villa Tamraz, Rue Jenah, Ramlet-el-Baida, Beirut, LEBANON P.O. Box. No. 8988-Beirut
Tel: 313152, 313173 Telex: 20336 LE (IHICO 20336 LE)
Cable Address: IHIHEAVY BEIRUT

JOHANNESBURG ■ 6th Floor, Carlton Centre, Commissioner Street, Johannesburg, SOUTH AFRICA P.O. Box No. 6607-Johannesburg
Tel: 21-8301, 8302 Telex: 43-0035 (43-0035 SA)
Cable Address: IHIHEAVY JOHANNESBURG

BANGKOK ■ Thaniya Bldg., 5th Floor, No. 62 Silom Road, BANGKOK
Tel: 38141 Telex: BK 2252 (IHI BK 2252)
Cable Address: IHICO BANGKOK

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Cable Address: IHICOSO SINGAPORE

HONG KONG ■ Room No. 825, Central Bldg., Pedder Street, HONG KONG
Tel: 236287, 231783, 258751 Telex: 3797 (HX 3797 IHICOHK)
Cable Address: IHICO HONG KONG

TAIPEI ■ Room 702, Chia Hsing Bldg., 96 Chung Shan N. Road, Sec., 2, Taipei, REPUBLIC OF CHINA
Tel: 550346, 550367 Telex: 11320 (11320 IHICO)
Cable Address: IHICO TAIPEI

MANILA ■ 2nd Floor, RFC Building, Gamboa Corner Salcedo St. Legaspi Village, Makati, Rizal, PHILIPPINES
Tel: 883817 Telex: 7425156 (IHICO 7425156)
Cable Address: IHICO MANILA

JAKARTA ■ Hotel Kartika Plaza, Room "T", Jl. M.H. Thamrin 10, Jakarta, INDONESIA
Tel: 52147 Telex: 44175 (IHI DKT 44175)
Calbe Address: IHICO JAKARTA

SYDNEY ■ 5th Floor, 213-219, Miller Street, North Sydney, N.S.W. 2060, AUSTRALIA P.O. Box. No. 688-North Sydney
Tel: 920-1375, Telex: 20480 (IHICO AA 20480)
Cable Address: IHIHEAVY SYDNEY

TEHRAN ■ 4th Floor, Tellai Bldg., Maydan Ferdowsi, Kutche Shahround No. 1, TEHRAN IRAN P.O. Box No. 828, TEHRAN IRAN

IHI Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan
HEAD OFFICE: New Ohtemachi Bldg., 2-chome 2-1, Ohtemachi, Chiyoda-ku, Tokyo, Japan Tel: Tokyo 03 (244) 6496 Telex: J22232, J22388, J22480, J24239 Cable Address: IHICO

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